ENGINEERING NEWS-RECORD

MARCH 23, 1961

PRICE 50 CENTS

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▶ **Outlook: Costs will go up again** *p.57*

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BUILDING
1 ST
QUARTER

Costs Roundup and Outlook

A McGRAW-HILL PUBLICATION

AUTOMATION . . . IN CONCRETE

The first of the nation's automated post offices went into operation recently in Providence, R. I. Under the cluster of concrete domes that form its roof are three miles of conveyors and processing machines that can automatically cull, sort, cancel and route 1,500,000 pieces of mail a day.

Penn-Dixie supplied both Portland cement and Mortar cement in the construction of this $16,000,000 project.

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PROVIDENCE RHODE ISLAND
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REGULAR, HIGH EARLY STRENGTH AND MORTAR CEMENTS

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Prime Contractor: *ITT-Intelex Systems, Incorporated, New York, New York* • Architect-Engineer: *Charles A. Maguire & Associates Engineers, Providence, R. I.*
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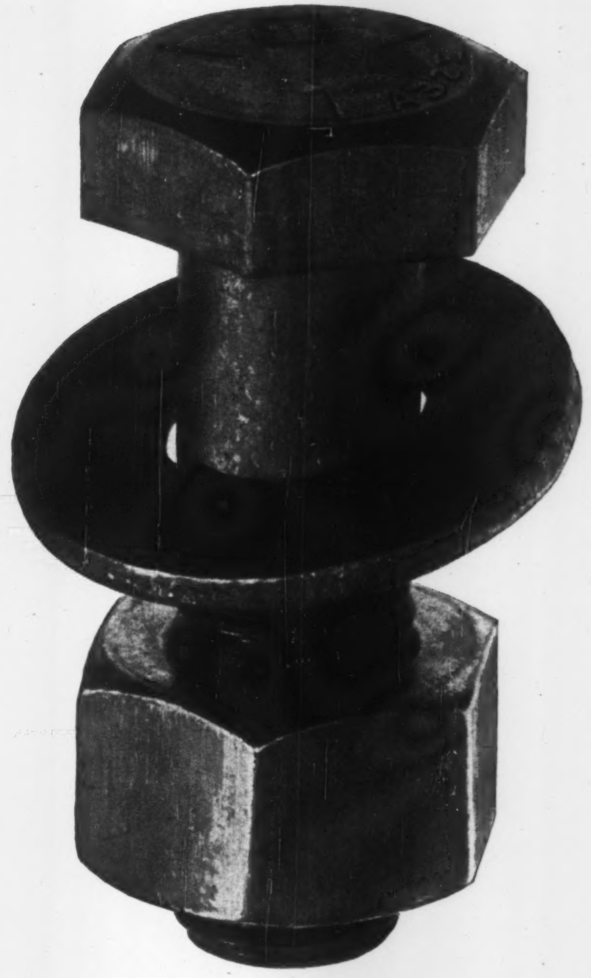

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Bethlehem stocks the new high-strength bolts for structural steel joints (large head, short thread) in all popular sizes—5/8 to 1 1/8-in. diameters, inclusive, in usual lengths, available now. Available soon—1 1/4-in. diameter, in usual lengths.

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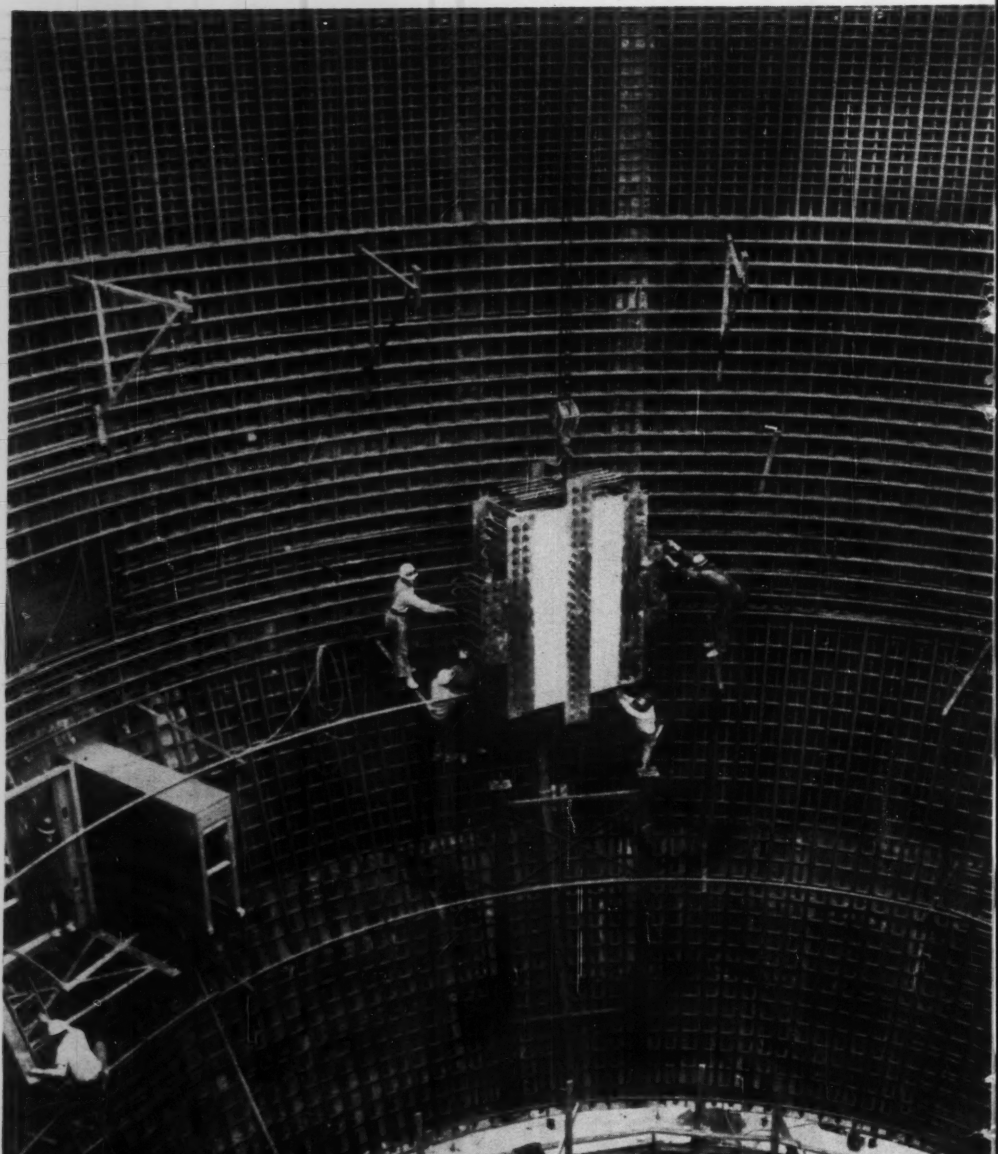
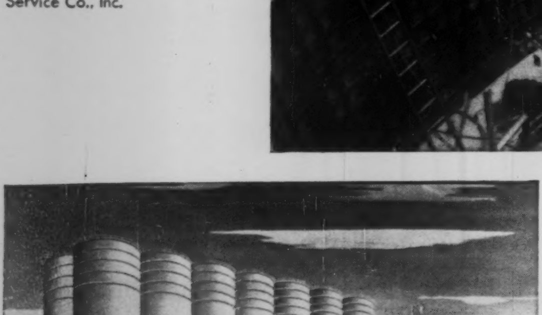


Missile base 4 months ahead of schedule—At a Kansas Missile base, re-bar work for the launch-control centers and huge Atlas silos, like the one at right, has just been completed—4 months ahead of schedule. Ryerson supplied 12,000 tons of re-bars for the job. And service included fabrication of a large tonnage of #14S and #18S bars.

SUPERVISED BY: U. S. Army Corps of Engineers for the U.S. Air Force.
GENERAL CONTRACTOR: Utah-Manhattan-Sundt.
RE-BAR PLACER: Camblin Steel Service Co., Inc.



12,000 tons of re-bars for Missouri River dam—The Oahe Dam near Pierre, S.D.—world's largest of the rolled earth type—will have installed power capacity of 595,000 KW and a reservoir 250 miles long. Re-bars, 12,000 tons of them for the Dam's massively reinforced powerhouse superstructure and surge tank bases, are being supplied by Ryerson—and re-bar work is proceeding on schedule.

AGENCY: U.S. Army Corps of Engineers, Omaha District.
GENERAL CONTRACTOR, Powerhouse superstructure and Surge Tank Bases: Atkinson-Ostrander Co., San Francisco.
RE-BAR PLACER: Camblin Steel Service Co., Inc.

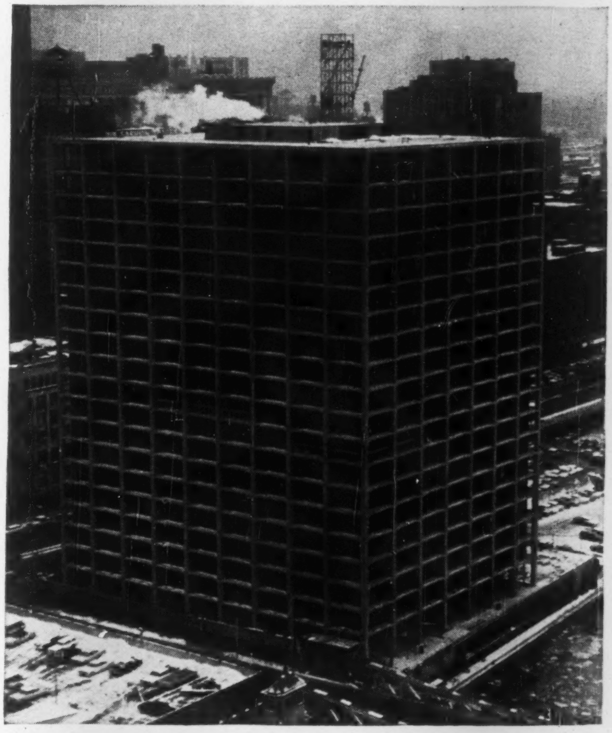
SPECIALIZED RYERSON RE-BAR SERVICE SPEEDS PROGRESS ON THESE IMPORTANT JOBS

On the most important jobs where supply problems are most complex and where schedule delays would be most costly, more and more contractors rely on Ryerson re-bar service.

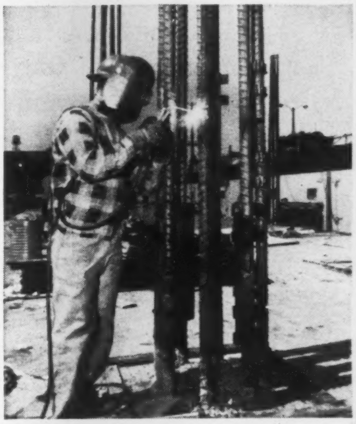
Ryerson's unsurpassed capacity is one reason—the nationwide scope of Ryerson service is another. A third reason is the range and flexibility of Ryerson service.

Our experience qualifies us to evaluate the special problems of each job and come up with re-bar service tailored to the particular requirements. For example, to expedite delivery and placement we may assign Ryerson specialists to the job site. Or to make quick schedule changes easy we may fabricate some steel at the site.

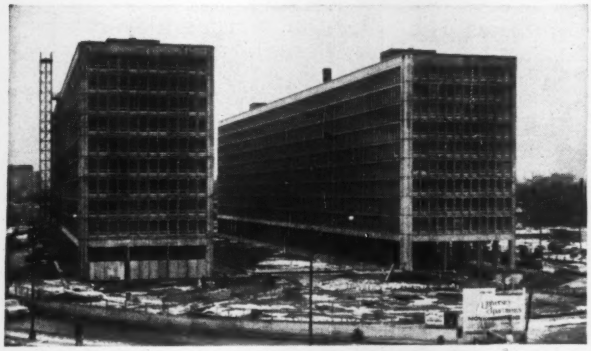
The next time you build with reinforced concrete, look to Ryerson for special reinforcing steel service—tailored to meet your requirements whatever the size or nature of the job.



Alloy Re-Bars save floor space in insurance tower—The Hartford Insurance Group's beautiful new Chicago building contains more than 3,600 tons of Ryerson reinforcing steel—including 600 tons of special alloy re-bars. The added strength of these bars, and the fact that they were welded end to end up through the columns accounted for these reductions in column size at the ground floor level: 15% dimensional reduction; 28% area reduction. Photo below shows welding of alloy bars at the job site.



OWNER: Hartford Fire Insurance Company, Hartford, Conn.
ARCHITECT: Skidmore, Owings & Merrill, Chicago.
GENERAL CONTRACTOR: George A. Fuller Co., Chicago.



Ryerson Service speeds urban redevelopment project—Handsome twin buildings at the University Apartments centered on re-routed boulevard, replace run-down dwellings on Chicago's south side. A part of huge Hyde Park redevelopment project sponsored by Webb & Knapp, buildings and garage beneath the central garden area contain about 2,000 tons of Ryerson reinforcing steel.

ASSOCIATED ARCHITECTS: I. M. Pei & Associates; Loewenberg & Loewenberg.
GENERAL CONTRACTORS: Taylor Construction Co., Miami; Webb & Knapp Construction Corp., Chicago—a joint venture.

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CIRCLE 5 ON READER SERVICE CARD

GOODYEAR

Q: What do Goodyear Earthmover Rims have that no others have?

A: MORE times FOUR

1. MORE rims on the job: More tons are hauled on—more earth-moving equipment rides on Goodyear rims than on any other kind. Result: You reap the benefits of the widest, soundest experience in rim design, manufacture and use.

2. MORE kinds of rims: Maximum rim performance stems from proper specification. Goodyear makes the *only complete line* of earthmover rims. Result: The choice that permits you to get exactly the right rim for the job.

3. MORE rim engineering help: Goodyear has more engineers designing *and selling* rims than any other company. And they know tires, too. Result: The help you need in choosing the right rim for top performance—longer tire life.

4. MORE rim "firsts:" The first *true* earthmover rim, the first 5° rim, the first tubeless rim—in fact, every major earthmover rim advance was made by Goodyear. Result: The very latest in rim design and manufacture at work, for you.

What better reasons for choosing Goodyear as your rim supplier? Only these: The desire and ability to design and build any rim that may be needed for *tomorrow's* earth-moving equipment. No matter what your rim needs or plans, you'll find it pays to call on Goodyear. See your local rim distributor, or write: Goodyear, Metal Products Division, Akron 16, Ohio.

GOODYEAR
EARTHMOVER RIM
FEATURES:
40% stronger, only 6% heavier
Heavy-duty, nonslip band driver
Positive air seal
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Lots of good things come from

GOODYEAR

Stabilizing grass growing through Soil Saver heavy jute mesh. ▼

▲ Soil Saver applied to highly critical center of steep grade median strip.

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and almost
as cheap

SOIL SAVER for highway erosion control

Are you one of those whose important concern is highway planning, construction and renewal? Then you need the essential facts about Soil Saver. Developed by Ludlow as a low-cost, simple, and effective method that immediately protects and secures seed and soil until it is permanently stabilized by vegetation, Soil Saver is a heavy jute mesh that wind, water or growing cover cannot displace.

Placed strategically in critical sections where flash run-offs and heavy rains threaten to erode or wash out new gradings on median strips, shoulder ditches and embankments, Soil Saver has dramatically proved itself with state highway departments across the country. Successful where other methods have failed, Soil Saver is both economical *and* effective. In rough comparison, costs of materials and labor for sod are 75% greater, while concrete and asphalt paving run a prohibitive 1400% greater than Soil Saver. Find out how Soil Saver can go to work for *you* . . . write Dept. EN-31 for full details.

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SOIL SAVER

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Needham Heights 94, Mass.
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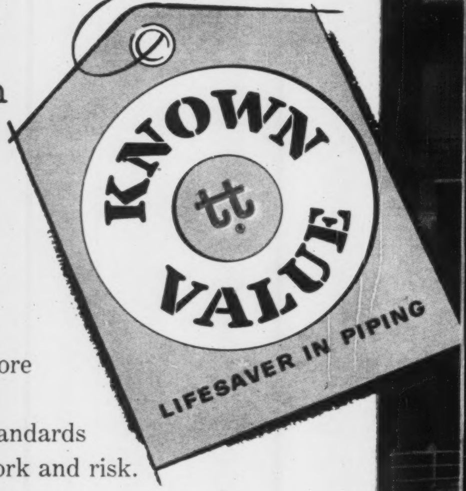

Every "TUBE-TURN" Bellows Expansion Joint rating certifies a definite cyclic life, ends the hazard of misleading "average" life warranties

Experienced piping engineers know it is risky to select bellows type expansion joints on "average" life warranties. They have often adopted more costly loop or offset pipe configurations just to be safe. This is no longer necessary. TUBE-TURN Bellows Expansion Joints have not only set new standards in design and performance, their certified cyclic life ratings end all guesswork and risk.

Everyone, piping designers, engineers and contractors, who have used TUBE-TURN performance-rated Bellows Expansion Joints *know* there is nothing like them on the market today. Be sure you have the facts on this new, better, lower-cost protection. Phone or write your nearest TUBE-TURN Bellows Expansion Joint specialists now. Also write us today for a copy of Bulletin TT 1035-C169. TUBE TURNS, Louisville 1, Kentucky.

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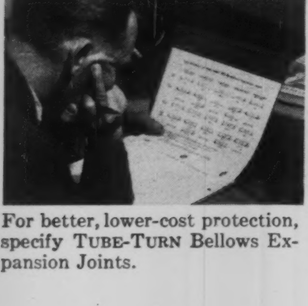
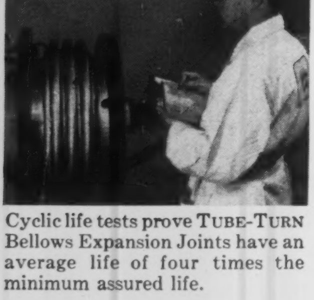


For better, lower-cost protection, specify TUBE-TURN Bellows Expansion Joints.



Cyclic life tests prove TUBE-TURN Bellows Expansion Joints have an average life of four times the minimum assured life.

TUBE TURNS

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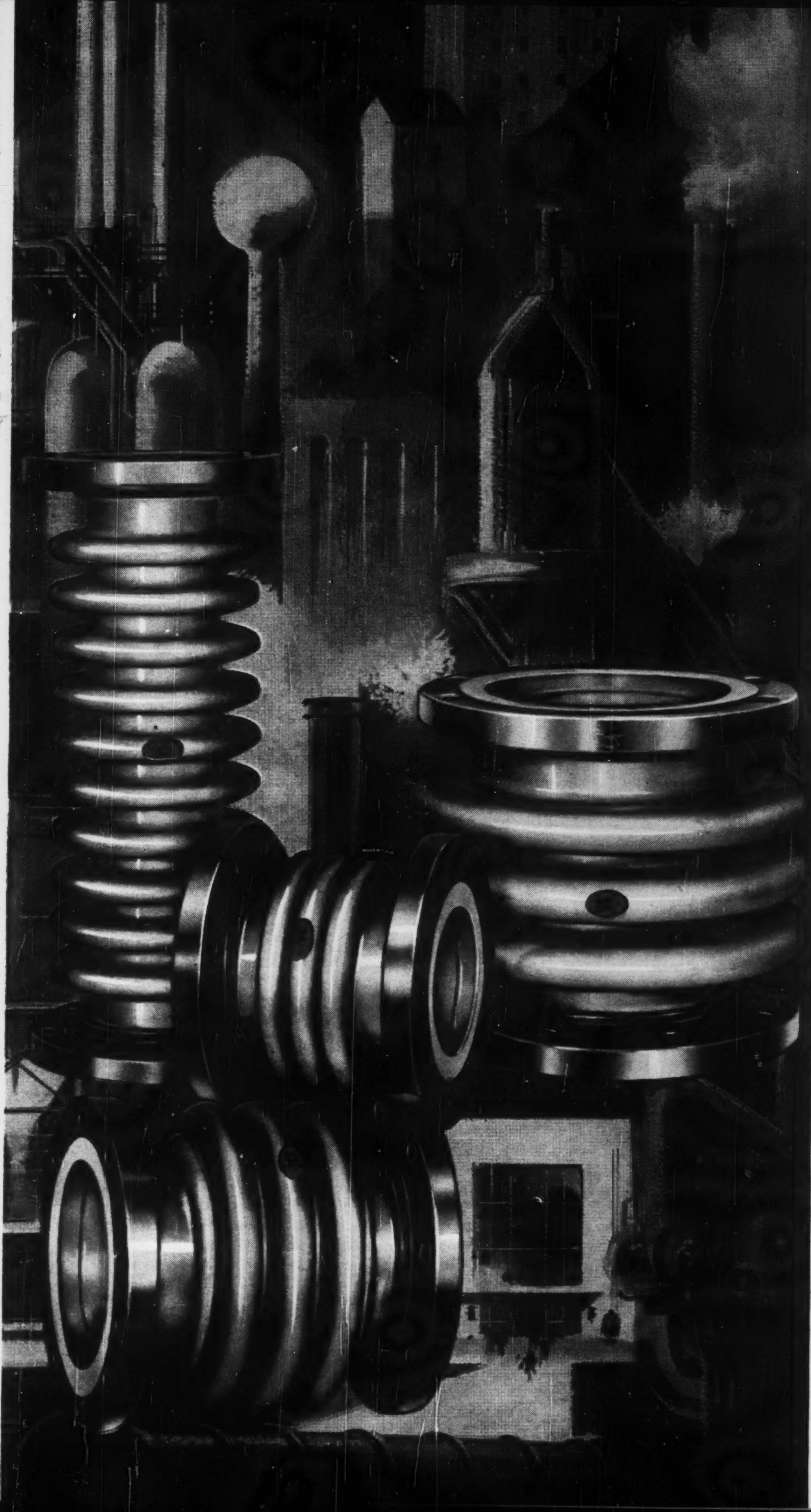
CIRCLE 8 ON READER SERVICE CARD



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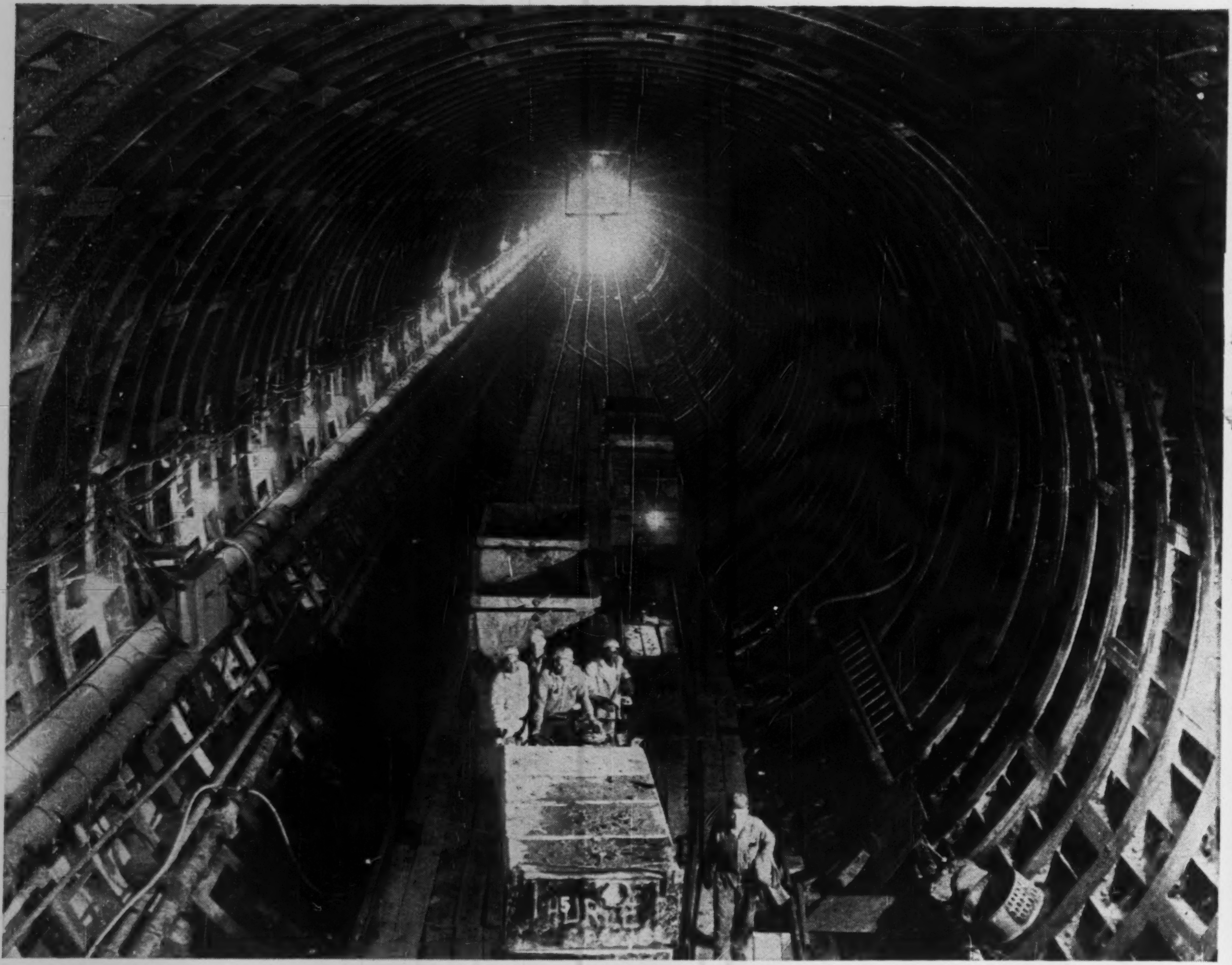
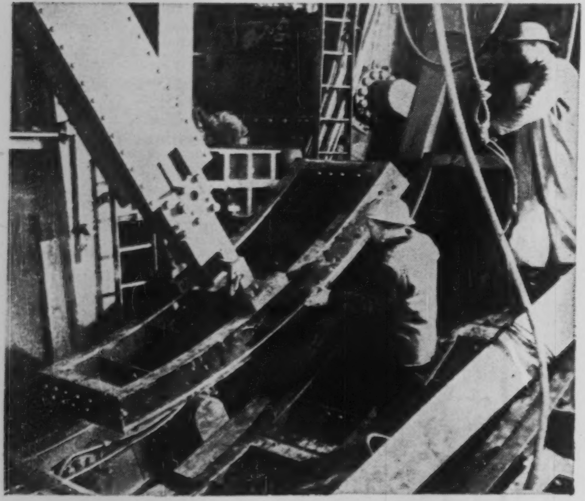


COMMERCIAL STEEL LINERS—Support and seal Callahan Tunnel. Sponsor: Massachusetts Turnpike Authority. Consulting and Designing Engineers to the Authority: Singstad & Baillie, New York City. Contractor: Perini Corporation, Boston.



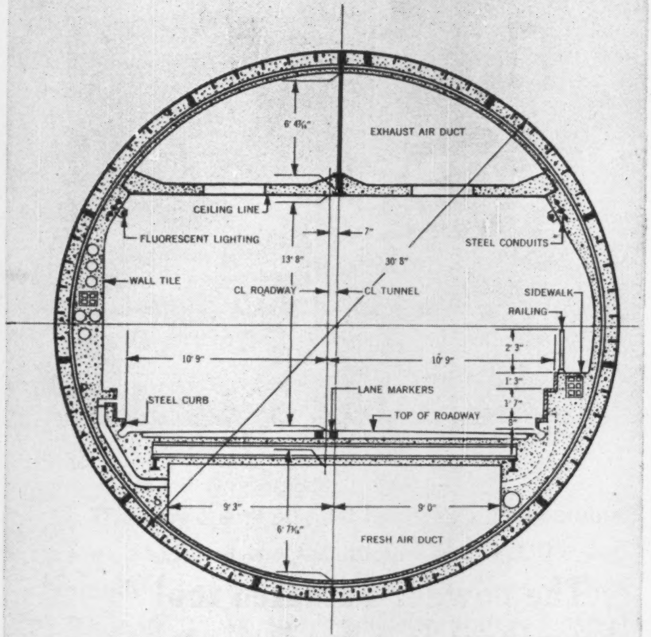
ERECTING "A" PLATE—Erector arm positions 1500 lb. ring segment. Note side flange gasket between bolt holes and skin plate.

How Steel Liners

New design concept of primary tunnel lining calls for fabricated steel plates in new 4848 ft., two lane, $29,000,000 vehicular tunnel

With completion expected ahead of schedule late this year, the Lt. William F. Callahan, Jr. Tunnel will be the Massachusetts Turnpike Authority's answer to existing traffic congestion in the present Sumner Tunnel under Boston Harbor. The Callahan project parallels Sumner Tunnel and will provide capacity for at least double the traffic load that currently can be handled.

Basic Requirements—A watertight, corrosive free primary tunnel lining, 100% load carrying, sections of which would have a clay blanket coverage of only 20 feet . . . A lining that must be easy and quick to erect inside the tailskin of the shield as the heading advanced through ground varying from silt to hard clay and hardpan . . . A long, hard look at construction cost to assure a toll facility economically practical and financially sound.



PRIMARY STEEL SUPPORT—Typical cross section of the new tunnel section shows details of steel lining. Concrete is used as a filler to protect structural steel and to finish inside tunnel contour.

INJECTING SEALANT—Waterproofing corner joints at gasket butt ends through grease type fitting in corner of each liner plate.

TAPPED GROUT HOLE—Placed in each liner plate, it provides connection to grout voids outside steel lining.

Support Watertight Boston Harbor Tunnel

How COMMERCIAL Helped—For the primary lining, we assisted the design engineers in developing this new type of lining. COMMERCIAL fabricated liner plates sufficient for 1813 complete rings. Each ring is 32" wide, curved to 30' 8" outside diameter. Eleven plates were required per ring and the standard "A" plate weighs about 1500 lbs. Each plate was fabricated from steel parts welded into a complete component. Fabrication included all flange holes used for bolting plates together. Extremely close tolerances had to be maintained—flange flatness was to +1/32" −0". Overall dimensions and plate curvature had to be held to very exacting requirements.

A longitudinal machined groove was placed in one side flange and in one end flange of each plate to hold a 3/8" square gasket. Strategically placed outside all flange bolts, this gasket seals out all water before it can reach any bolt holes. Thus, caulking around all bolt holes and segment joints is eliminated.

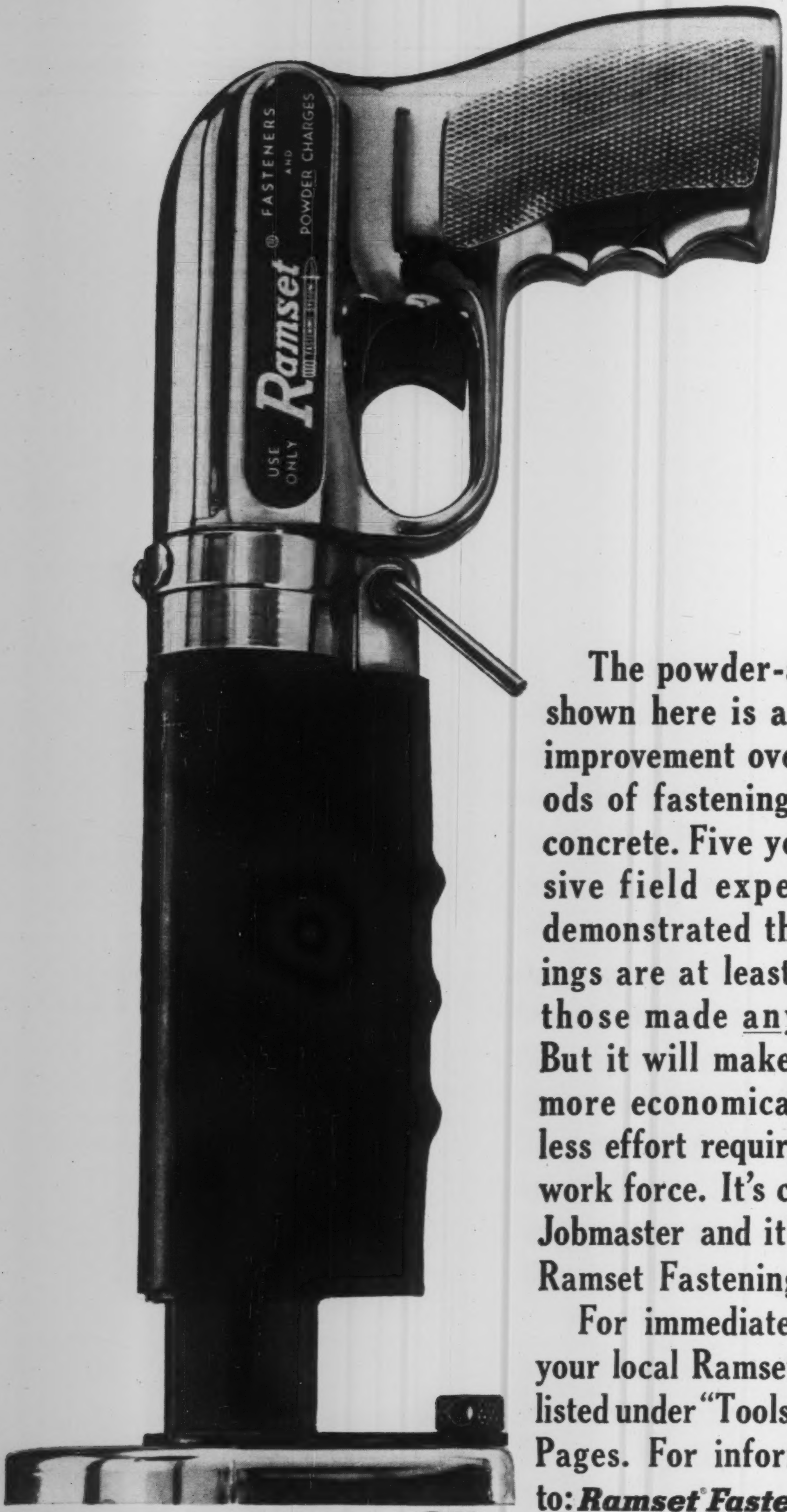
Through a special fitting placed near a corner of each plate provision was made to pressure-inject polysulfide synthetic rubber sealant to fill any potential voids that might exist where ends of gaskets meet. Thus, the steel lining was made completely watertight.

The outer surface of each plate was covered with a heavy, tough, protective coating of hot-applied asphaltic enamel.

The Result—For the first time, a completely dry tunnel having a 100% load bearing, corrosive free fabricated steel primary lining with a poured concrete secondary lining which serves only to finish interior contours.

The full story of how the Callahan Tunnel was built for the Massachusetts Turnpike Authority is available and can be obtained free of charge by writing to Commercial Shearing & Stamping Company, Dept. E-12, Youngstown 1, Ohio.

COMMERCIAL
shearing & stamping



The powder-actuated tool shown here is a fundamental improvement over other methods of fastening to steel and concrete. Five years of extensive field experience have demonstrated that its fastenings are at least the equal of those made any other way. But it will make them faster, more economically, and with less effort required from your work force. It's called the Duo-Jobmaster and it's part of the Ramset Fastening System.

For immediate service, call your local Ramset dealer. He's listed under "Tools" in the Yellow Pages. For information write to: ***Ramset® Fastening System***

WINCHESTER-WESTERN DIVISION **Olin** 287C-X Winchester Ave., New Haven 4, Conn.

Get more work done . . .

the "Euc" C-6 tops them all for versatility!

The easy operation, fast response and all-around work-ability of the Euclid C-6 make it the outstanding crawler in the 200 h.p. class. Proven Torqmatic Drive provides full power shift and instant reverse with no delay for clutching . . . with a flick of the wrist you change direction or speed range. Dependable GM 6-71 engine delivers 211 net h.p. to the power train . . . common steering-braking contributes to easy operation and exceptional maneuverability under all working conditions.

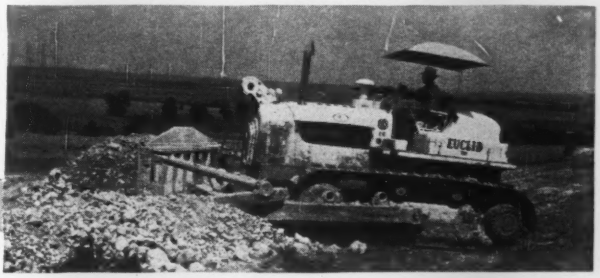
And there's nothing that comes close to the C-6 for service accessibility that cuts downtime and pays off in more work-ability. Unitized assembly of major components cuts repair and replacement labor costs to the absolute minimum . . . well below those for comparable tractors.

EUCLID Division of General Motors
Cleveland 17, Ohio

Plants at Cleveland and Hudson, Ohio
and Lanarkshire, Scotland

Get all the facts and figures on the C-6 . . . you'll find that low operating cost plus reliable performance on the toughest jobs make it your best tractor investment.

***DOZING and RIPPING* . . . plenty of power, good stability and exceptional maneuverability make the C-6 a top performer in rough work and heavy material.**

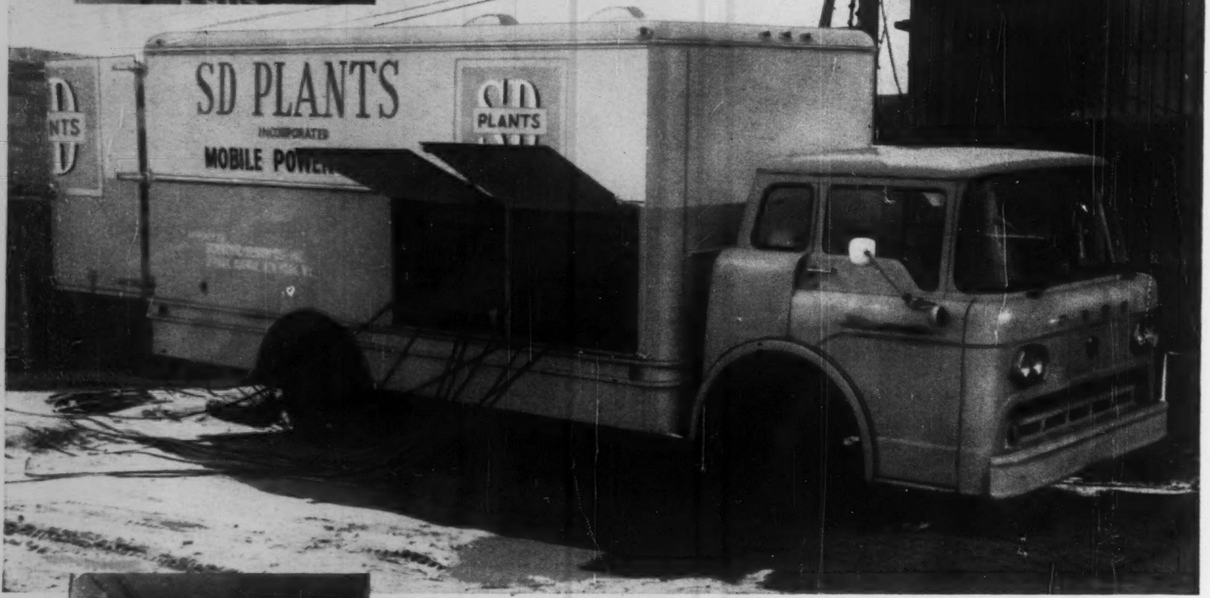


GM GENERAL MOTORS EUCLID

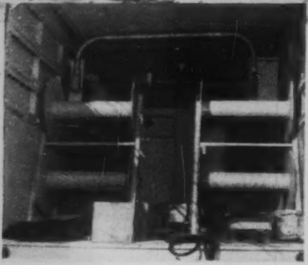
EUCLID

FOR MOVING EARTH, ROCK, COAL AND ORE

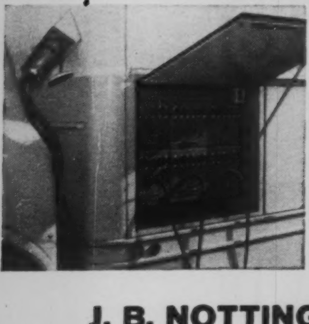
15 minutes ago this multi-arc WELDING SYSTEM *on* WHEELS *was still on the road!*



SD PLANTS, INC., IS AN AFFILIATE OF SCIENTIFIC DESIGN CO., INC., NEW YORK.



Cables may be run out from reels on truck (above) to arcs hundreds of feet away. Rugged silicon rectifier unit, behind reels, powers 30 arcs. **Primary plug-in connection** (below, just behind cab) is completely weatherproof, energizes entire system. Lifting hinged side panel reveals six of the resistor units for individual arc control. The truck is also a general power distribution center for stud welding, flood lighting



TAKE FULL ADVANTAGE OF TIME-SAVING, COST-CUTTING MULTI-ARC WELDING with this complete 30-operator MobilArx system packaged in a truck. Tested for more than two years on the toughest construction jobs, it's ready to go to work for you.

ONE PLUG-IN CONNECTION PROVIDES POWER FOR THIRTY WELDERS! All the equipment to power up to 30 arcs, all packaged in one mobile unit that rolls right to the job, ready to weld in minutes. Welders control arcs individually with 24 resistor units accessibly mounted on truck, 6 portable units placed anywhere on job site.

MEET CONSTRUCTION DEADLINES. Plug in just one primary connection, unreel the cables, and start welding! MobilArx "welding system on wheels" cuts set-up and take-down time from hours to minutes, ends handling separate units, simplifies adding arcs as jobs progress.

CUT WELDING COSTS WAY DOWN, ALL WAYS . . . in investment: A multi-arc system costs about half as much as the same capacity in single-operator welders . . . and MobilArx gets around to do the work of several less mobile systems! Rugged equipment with nothing to burn out or wear out cuts per-year owning costs . . . **in handling:** saving time saves money . . . **in power:** uses a fraction as much as conventional motor-generator sets, and with better power factor . . . **in space requirements:** takes less room in storage or on the job, keeps equipment and cables out of workers' way . . . **in upkeep:** inherent simplicity, sturdy construction minimize maintenance.

GET BETTER WELDS. Excellent voltage regulation, spatter-free arc action produce high tensile strength, porosity-free welds . . . in standard metallic arc welding in all positions, tungsten arc welding, consumable electrode welding, stud welding, arc air gouging, other processes.

Get the full facts on this construction cost-cutter. For technical data sheet with complete specs — or first-hand information on MobilArx for your job — ask your nearest Nottingham office or

NOTTINGHAM *MobilArx*

Safety-engineered Building-Blok equipment for multi-arc welding

J. B. NOTTINGHAM & Co., Inc. 441 LEXINGTON AVE., NEW YORK 17, N. Y.

Reader Comment

It's Wood, Not Brick

SIR—In your coverage of the 1960 American Institute of Architects awards (ENR Feb. 23, p. 24), the New Harmony, Ind., shrine designed by Philip Johnson is twice described as being "roofed by a fluted brick dome."

That dome was made up of two layers of ¼-in. exterior fir plywood glued and screwed to a framework of glue-laminated arches. Cedar shingles were then applied over batten strips.

While brick certainly has its place in the total concept of the shrine, and was used for the wall enclosing the area, there is none in the dome.

GEORGE C. CHEEK
Douglas Fir Plywood Assoc.
Tacoma, Wash.

SIR—It was with suprise and disappointment that we read your description of the construction of the Blaffer Trust Shrine, New Harmony, Ind.

You describe it as "a fluted dome of brick supported at six points." This was entirely incorrect—no brick was used. A more accurate description would be:

"Six laminated wood parabolic arches constituted the main framing. Inclined parabolic purlins between the arches create the fluted effect. Wood shingles, the outside roof covering, completed the structure."

NORMA SCOLATTI
Unit Structures, Inc.
Peshtigo, Wis.

'Design and Construct'

SIR—The article "Design and Construct Spans St. Lawrence" (ENR Feb. 16, p. 44) describes an excellent example of what can be done when contractors and private engineering consultants are permitted to use their talents, experience and facilities in lowering construction costs on engineering projects. The owner of the Champlain Bridge, the National Harbours Board, as well as their consultants, H. H. L. Pratley and Lalonde and Valois, are to be commended for allowing the bidders to submit alternate designs.

Much has been said for and against the use of alternate designs prepared by the bidders. The fact remains, however, that it has been proved in Europe

(Reader Comment continues p. 32)

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

Ease the profit squeeze

with a handy **PAYLOADER**®

Versatile tractor-shovel performs 3 operations

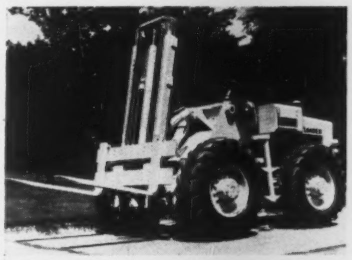
At a million dollar high school construction project, this H-30 PAYLOADER *loads* excess dirt and *backfills* with its 1-cu. yd. bucket . . . it also installs a good share of the 6,000-cu. yds. of *trenches* required with its rear mounted back hoe. NET RESULT: One operator and this multiple-duty PAYLOADER saves dollars in labor every day *plus* the added cost of maintaining several single-purpose machines.

The 4-wheel-drive Model H-30 PAYLOADER is a natural for any construction, maintenance or repair project. Compact in size and modest in price, it features the latest improvements of larger PAYLOADER units. Its advantages in performance, safety and operation are not found in any comparable machine. Check these features:

CAPACITY — 3,000-lb. operating capacity; 1-cu. yd. bucket; 8′-4″ dumping clearance and 29″ reach ahead of tires.

OPERATING EASE — Power steering; full power-shift transmission with torque converter; sealed hydraulic brakes on all 4 wheels.

POWER AND TRACTION — 6-cyl., 77½-h.p. gas engine to handle peak loads; 4-wheel drive with 3 forward and 3 reverse speeds up to 25.7 mph.; shifts in either direction made "on-the-go", no foot clutching.



FORK LIFT TRACTOR handles 6,000-lb. loads up to 21′ height. 4-wheel drive, power steering, power shift transmission, 4-wheel hydraulic brakes.

To learn more about the cost-cutting uses of PAYLOADER tractor-shovels, their sizes (there are 8, up to 12,000-lb. operating capacity) and interchangeable attachments that best fit your needs, contact a Hough Distributor nearby, or return the coupon.

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THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
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CIRCLE 15 ON READER SERVICE CARD

JOE IS PROUD OF HIS

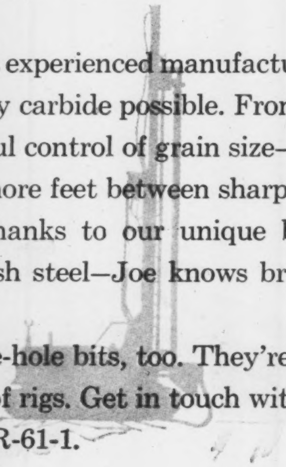
Good reason, too! He's got a 9-inch down-the-hole bit from Sandvik-Coromant, and that means he's got a bit that's better than he's ever used before!

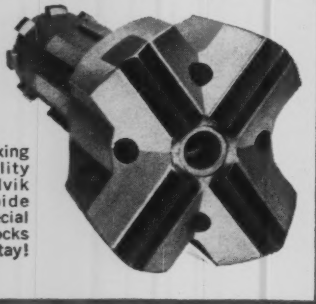
Strong statement? Sure. But here's proof:

First, Sandvik is one of the world's largest and most experienced manufacturers of tungsten carbide. Therefore, Joe gets the highest quality carbide possible. From more effective refining, through better mixing, to more careful control of grain size—everything possible is done to assure Joe longer bit life and more feet between sharpenings.

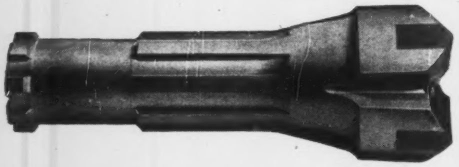
More proof: Sandvik carbide inserts *stay in*, thanks to our unique brazing method. And since the entire bit is made from Swedish steel—Joe knows breakage won't be a problem.

You'll be happy with Sandvik-Coromant down-the-hole bits, too. They're available from 4¾ to 9 inches in diameter, and for all types of rigs. Get in touch with your nearest Atlas Copco office today, or write to Dept. ENR-61-1.





Better refining, mixing and over-all quality control by Sandvik means best carbide possible. And a special brazing method locks the inserts in to stay!

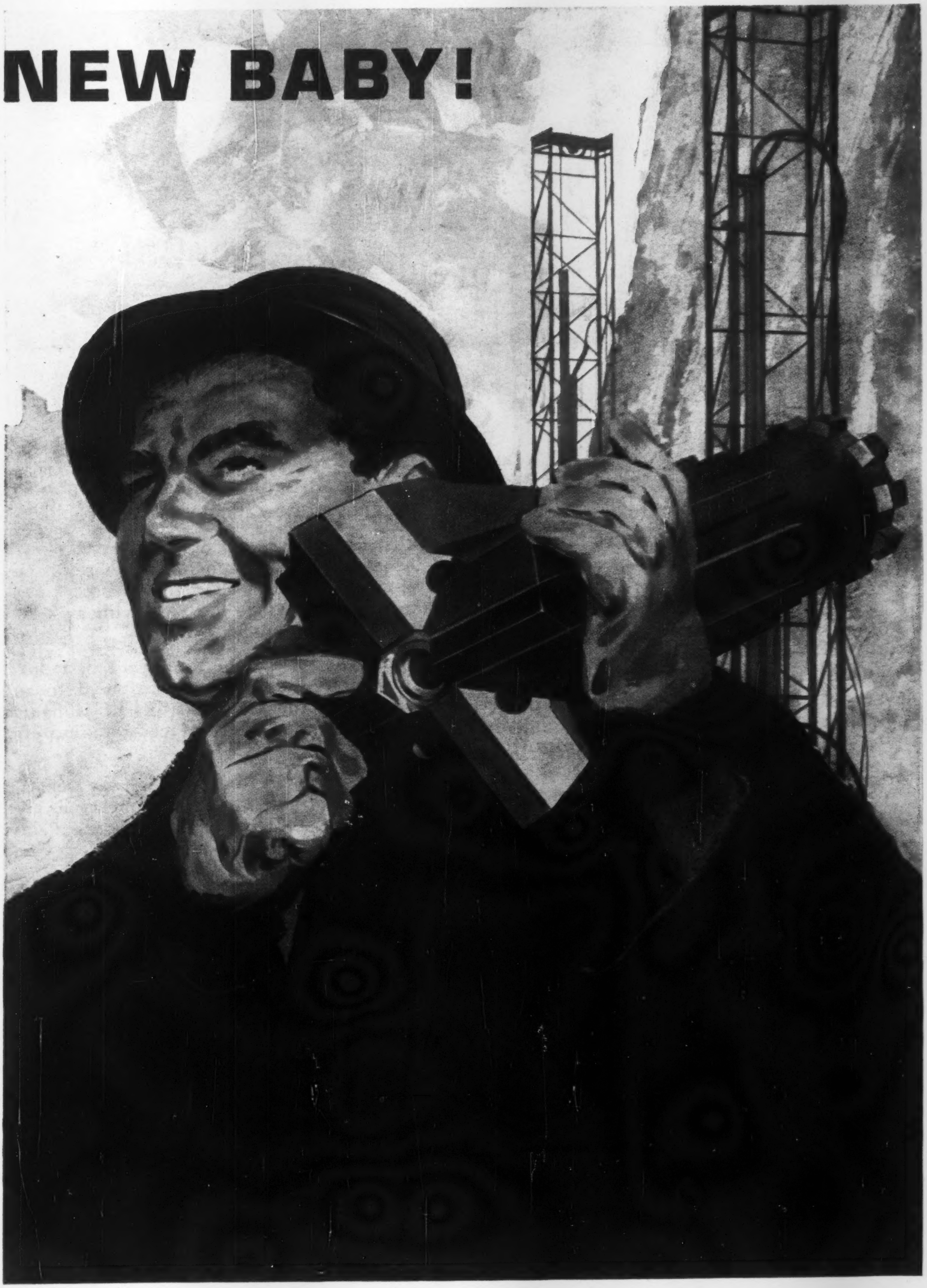


Sandvik down-the-hole bit bodies are made from Swedish steel by Swedish craftsmen. Result: less breakage... longer life!

Atlas Copco Inc.

610 Industrial Avenue, Paramus, New Jersey • COlfax 1-6800
930 Brittan Avenue, San Carlos, California • LYtell 1-0375

CIRCLE 16 ON READER SERVICE CARD

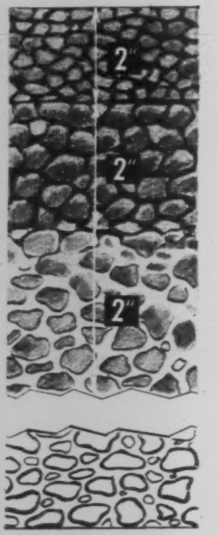

NEW BABY!

FOUND!

A winning combination: Asphaltic concrete made with Chevron Asphalt over a Dilute Bitumuls Treated Base.

For "Deep-Strength" Construction PLUS Economy!

Realignment of U. S. Route #99 (Pacific Highway) between Albany and Eugene, Oregon, involves construction of twelve miles of new, heavy-duty pavement.



4 inches Asphaltic Concrete made with Chevron Asphalt; laid in 2 lifts as indicated.

Top 2 inches of crushed stone base treated with diluted Bitumuls; then compacted.

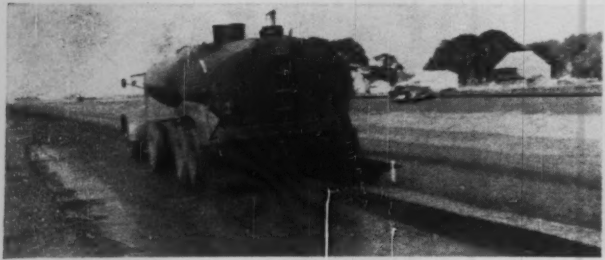
Compacted base stone

The original "specs" called for construction of a compacted stone base, surfaced with 4 inches of asphaltic concrete. As a result of preliminary tests, however, a Field Change Order was issued specifying treatment of the top 2 inches of the base with an economical nine-to-one dilution of Bitumuls.

Dilute Bitumuls Treatment "controlled" the top of the base during surfacing; provided water-resistance that contributed to an overall stronger pavement. Over the base, two lifts of asphaltic concrete made with Chevron Asphalt were placed to complete the construction.

The job is under the direction of the Oregon State Highway Department. The contractor, Warren Northwest, Inc., has done a fine job of coordinating all phases of the job. One key factor in maintaining operations on schedule has been the dependable, on-time service on Bitumuls and Chevron Asphalt deliveries.

Call office nearest for details on how Bitumuls Emulsified Asphalts and Chevron Paving Asphalts can be combined to give you better pavements at lower cost.



Dilute Bitumuls-Treated Base

Surfacing (made with Chevron Asphalt)

American Bitumuls & Asphalt Company

320 MARKET, SAN FRANCISCO 20, CALIF.
Perth Amboy, N. J.
Baltimore 3, Md.
Cincinnati 38, Ohio

Atlanta 8, Ga.
Mobile, Ala.
St. Louis 17, Mo.
Tucson, Ariz.

Portland 8, Ore.
Oakland 1, Calif.
Inglewood, Calif.
San Juan 23, P. R.

BITUMULS® Emulsified Asphalts • CHEVRON® Paving Asphalts • LAYKOLD® Asphalt Specialties • PETROLASTIC® Industrial Asphalts

Safer, Brighter, Easier to Service with Swivel Head and Double-Beam Warning

DIETZ Visi-flash
TRANSISTORIZED WARNING LIGHT
PRODUCT NO.
SERIAL NO.
DIETZ Visi-flash

No. 665

No. 675

DIETZ

NEW Visi-Flash®

Barricade Flashers

Offering the last word in a flasher optical system . . . one that concentrates more light on the danger or obstacle, re-inforcing the flashing light with a brilliant fringe of reflected light from the headlamps of oncoming traffic.

Flashers that are easier to service, that require less servicing per hour of use, and that will turn on and off as daylight fades or dawns.

No mechanical switches or other moving parts to consume current or cause trouble. Wide choice of low-drain transistorized circuits offer an extensive range of flash rates. Drain on batteries is so slight that even the two-cell No. 665 model will burn about 1500 hours, while the six-cell No. 675 will burn about 4500 hours.

10 IMPORTANT FEATURES

- Big 7¼" lens, especially for flasher use
- Optional ½" reflector rim offers full 10 sq. in. of reflecting surface
- High-brightness neon lamp or standard filament
- Can be rotated 180° to cover any approach angle
- Choice of flash rates and candlepower
- Optional photocell to turn light on, off
- Diecast visor deflects snow, rain, sun and streetlights
- Attached to barricade by tamper-proof bolt
- Single screw, always fastened to head, affords easy servicing of lenses and bulb
- Rugged 18-gauge steel body

Also available in Canada

GO DIETZ® and you go SAFELY!

MAIL THE COUPON NOW — GET ALL THE FACTS

R. E. DIETZ COMPANY, Dept. 53
225 Wilkinson St.,
Syracuse 1, N. Y.

Please send complete information on your improved Visi-Flash Warning Signals, Nos. 665 and 675.

NAME ____________ TITLE ____________

COMPANY ____________

STREET ____________

CITY ____________ ZONE ____________ STATE ____________

CIRCLE 19 ON READER SERVICE CARD

CIRCLE 20 ON READER SERVICE CARD→

Barber-Greene
SA-40

New Barber-Greene

Latest addition to Barber-Greene Finisher line is a new step forward in advanced design and superior performance.

Barber-Greene's Model SA-40 is a new achievement in ease of operation and automatic features, combined with simple construction for greatest accessibility and ease of maintenance.

Its wide range of paving speeds to 100 F.P.M. and travel speeds to 4 M.P.H., together with its many other features assure the greatest tonnage production every hour—day and year of its long life.

Some of its outstanding features are shown below. Whether you are in the market now or not, you should be familiar with all of the advantages of this completely new modern design. Your Barber-Greene distributor will gladly give you full information. No obligation.

Only Barber-Greene Offers You Five Choices

COMPACT: Model 873, paves on crawlers, travels on rubber.

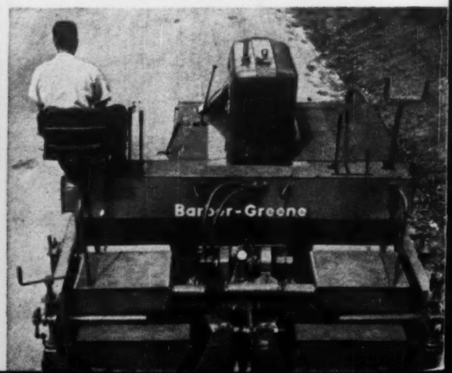
GENERAL DUTY: Model 879-B and new Model SA-40.

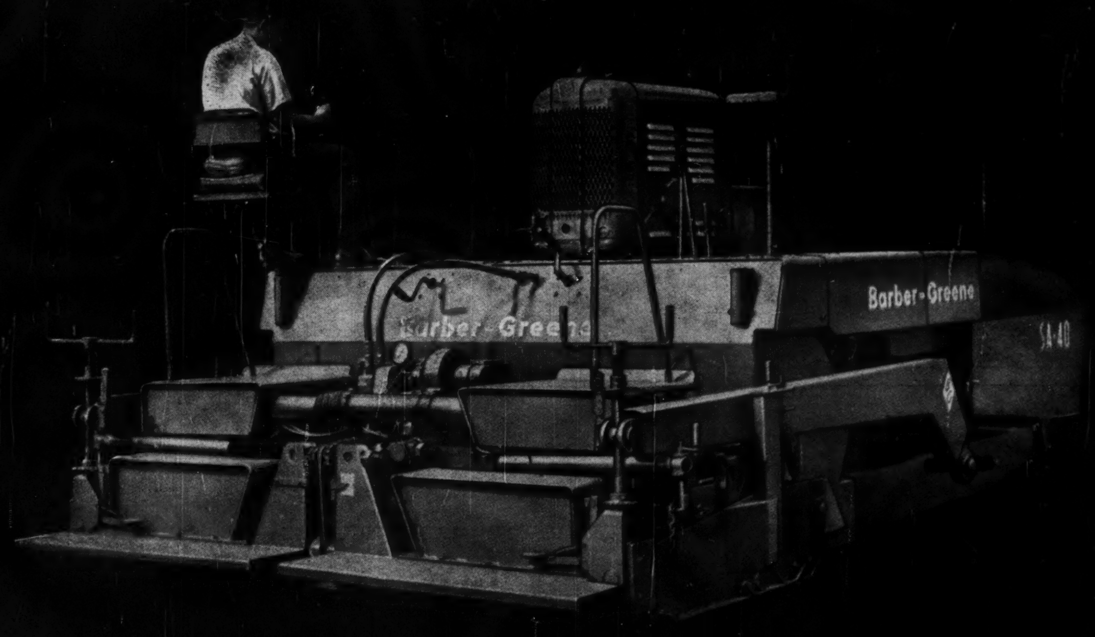
HEAVY-DUTY: Model SA-60 on Crawlers and Model SB-60 on Pneumatics.

NEW EASE OF OPERATION. Joystick, power-assist steering. Switches on joystick control self-dumping hopper, screed hoist, etc.

HYDRAULICALLY SELF-DUMPING HOPPER. Tunnel extends to rear of chassis for maximum capacity and fastest truck dumping. Hopper gates controlled from screed platform while paving.

HEAVY-DUTY LONGER LIFE SCREED. Hydraulically operated, high speed tamper compacts before strike-off. Improved automatic leveling. Twin screed heaters.





SA-40 Finisher

Model SA-40 paves standard 10′ widths—variable from 8-14′. Handles all asphalt mixes. Carries shift-long fuel supply in 28-gal. tank.

World's No. 1 Manufacturer of Asphalt Paving Equipment

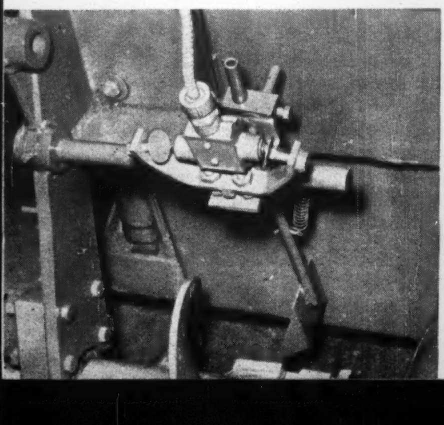
Representatives in Principal Cities of the World

Barber-Greene BG

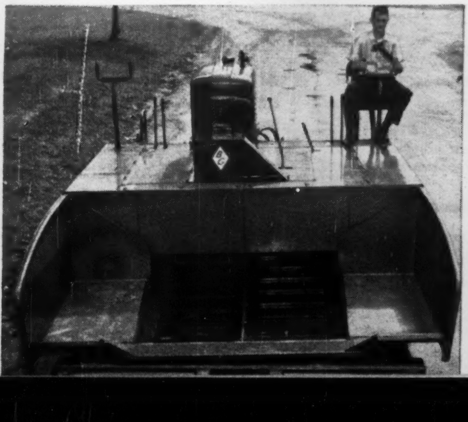
Main Office and Plant AURORA, ILLINOIS, U. S. A.
Other Plants: DeKalb, Milwaukee, Detroit, Canada, England, Brazil, Australia

CONVEYORS · LOADERS · DITCHERS
ASPHALT PAVING EQUIPMENT

AUTOMATIC FEEDER CONTROL operates each pair of feeders and screws independently. Override switches on steering column.



OSCILLATING PUSH ROLLERS pick up trucks on-the-fly regardless of alignment. New long crawlers provide the ultimate in traction, leveling, and stability.



SIMPLIFIED SERVICING achieved through unitized construction and simple, efficient power train. Hinged deck plates for easy perimeter access.

LINK-BELT SPEEDER ¾-yd. LS-78 with optional tractor lower...

Pilot model passes 800-mile torture test with flying colors

The Link-Belt Speeder LS-78's tractor-track furnished ground-hugging traction no matter where the pilot model traveled — in the mud and muck of the Link-Belt Speeder proving grounds, the abrasive sands of the great Southwest, the punishing rock of the Big Bend region of the Rio Grande, and the hill country of southern Indiana.

During the one-year period the tracks were adjusted only *twice*. And this took the operator about five minutes per track belt, thanks to the exclusive hydro-piston adjustment with a grease gun. Compare this with a delay of up to three or four hours on some rigs that have only an adjusting bolt and nut arrangement.

Not once did the LS-78 walk out of its tracks! The reliable track compensating unit freed the track belt of branches, stones and other objects in its 800-mile journey. Snags and pesky obstructions proved no stopper either. The 22-inch high-clearance lower skimmed over them.

For further details on the exclusive LS-78 drag-clam-hoe with a *proven talent for travel,* see your local distributor. Or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

109-61N

Normally high-wear track components

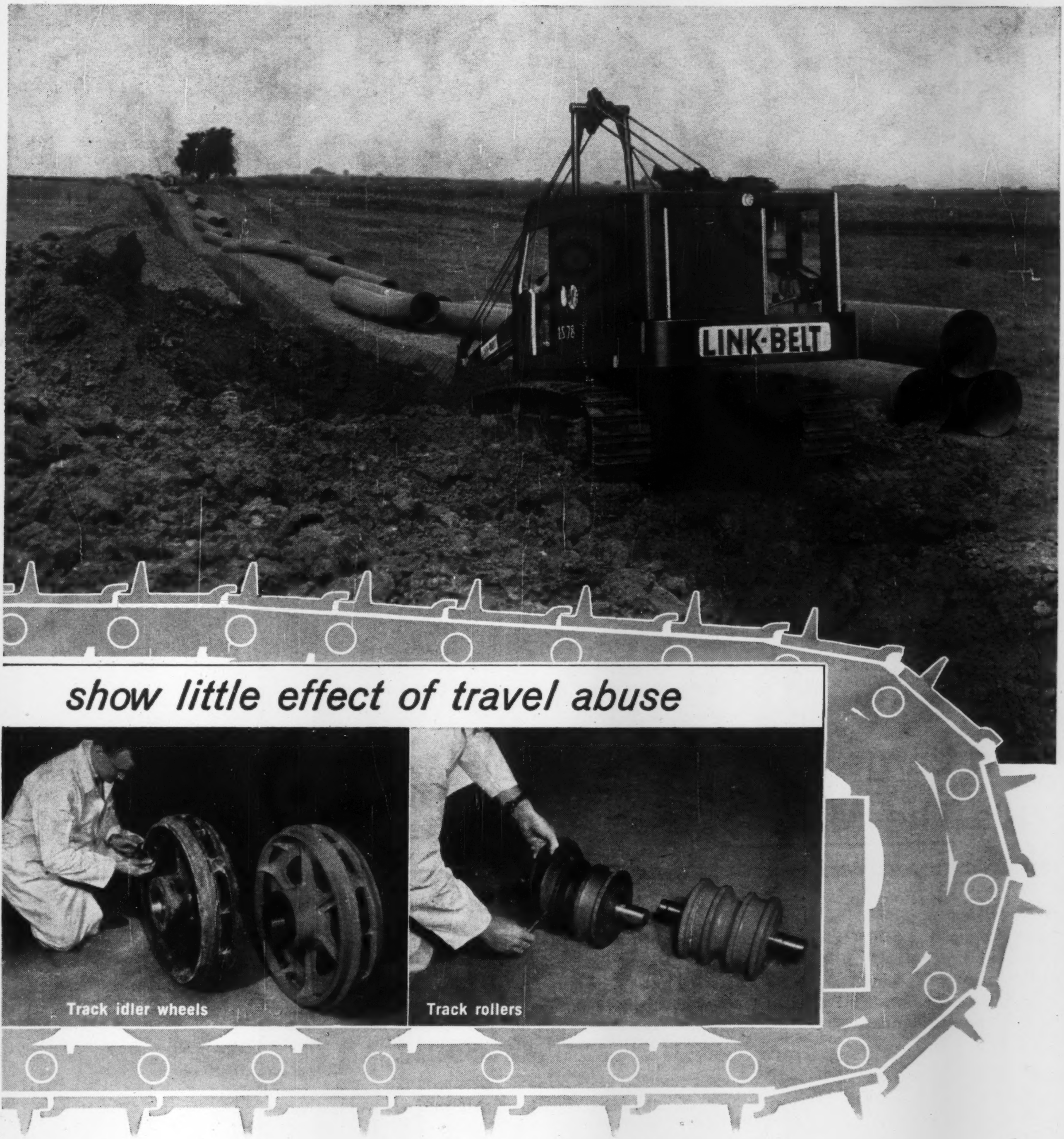
Track drive wheels

Track rails

After one year of testing (800 miles of travel), the LS-78 pilot model was returned to the factory for complete teardown and testing for wear. Four of the normally high-wear components were steam-cleaned and photographed beside new components in the series of pictures above. So negligible was the wear that if it were not for a fresh coat of paint on the new components, it would be difficult to distinguish between the two in each case.

1936 1961 | 25 years of controls leadership

CIRCLE 22 ON READER SERVICE CARD


LINK-BELT
1578

show little effect of travel abuse

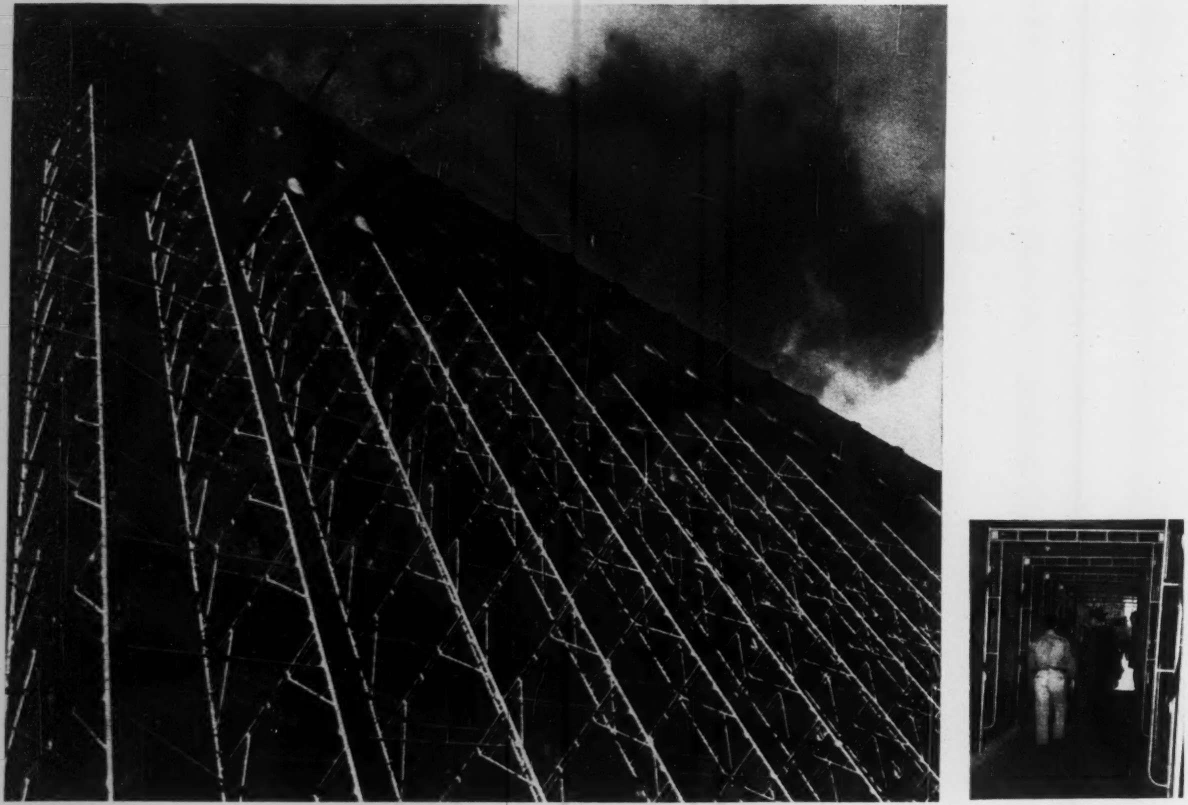
Track idler wheels

Track rollers

LINK-BELT SPEEDER

21 crawlers
6 truck-cranes
4 self-propelled

It's time to compare . . . with Link-Belt Speeder



2100 frames of modern "Trouble Saver"® Sectional Steel Scaffolding make *efficient* working platforms on an 18-story demolition job, by Lippsett, Inc., in New York City. At right, only 32 PS Co. Sidewalk Canopy Frames provide *safe* pedestrian protection during overhead renovation, by Banta Brooks, contractor, on American Bank building, Lansing, Michigan.

On Large Jobs . . . or Small
It's The Method That Adds Efficiency and Safety

. . . *and you get it* – with modern PS Co. Scaffolding and Shoring Methods.

Steel scaffolding and shoring are important factors in the overall efficiency and safety of construction jobs, large or small. Yet *the method* of applying scaffolding and shoring to the job at hand is just as important.

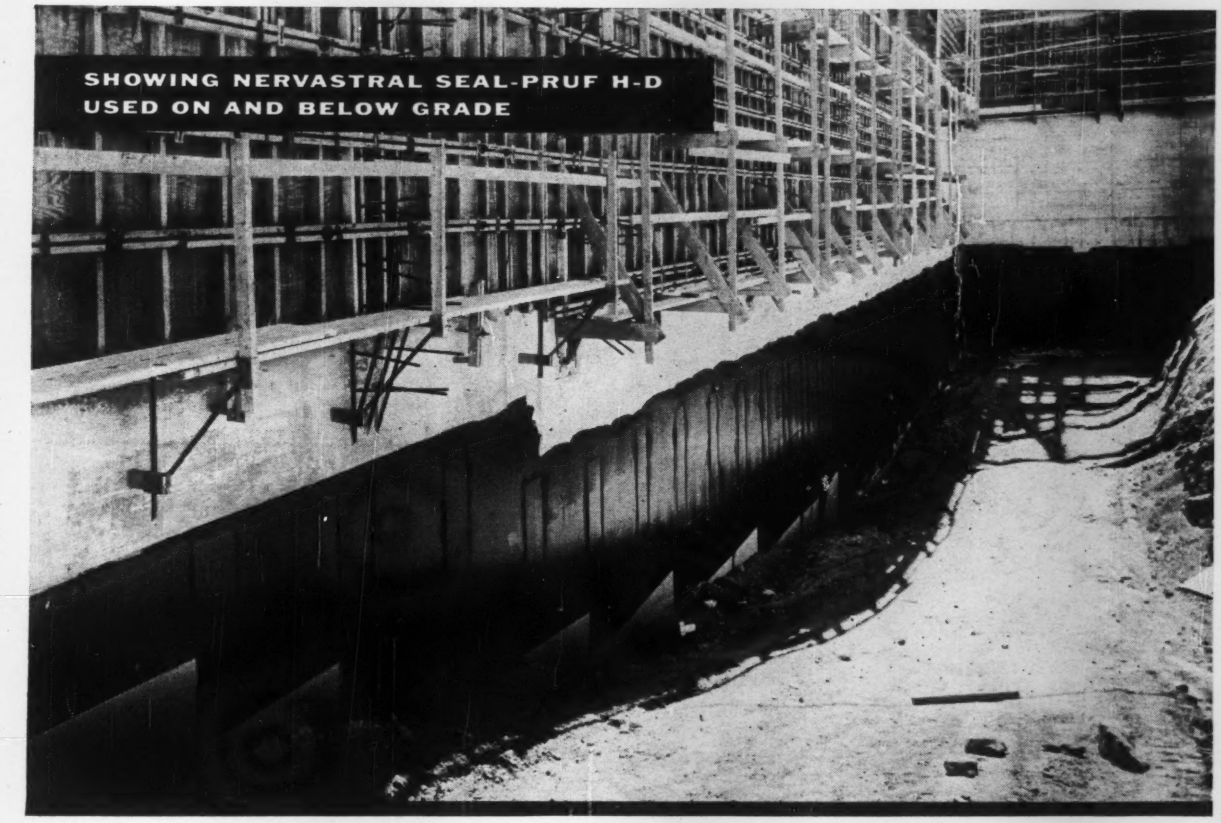
PS Co.'s modern scaffolding and shoring methods fit the widest range of equipment to the exact requirements of the job at the lowest possible cost. These methods are constantly developed and refined by meeting the varying needs of all types of contractors and sub-contractors, day in and day out.

Engineering help is available through 24 branch offices. At each of these locations, warehouses stock the many types of scaffolding used when recommending the correct method for large or complicated jobs, or for small or routine jobs where *the method* is also important.

PSCo STEEL SCAFFOLDING & SHORING • SALES • RENTALS

THE PATENT SCAFFOLDING CO., INC.

38-21 12th Street Dept. ENR, Long Island City 1, New York
1550 Dayton St. Chicago 22 • 6931 Stanford Ave., Los Angeles 1
Branches in all principal cities
IN CANADA: Canadian PS Co., 329 Dufferin St., Toronto

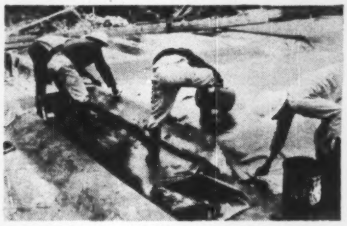


SHOWING NERVASTRAL SEAL-PRUF H-D USED ON AND BELOW GRADE

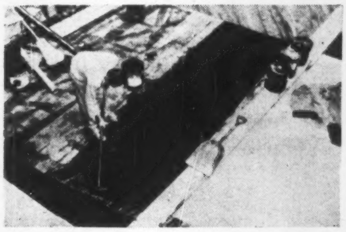
Nervastral Seal-Pruf

NERVASTRAL

COMBINES ENGINEERING WITH MODERN CHEMISTRY IN PRODUCTS FOR MEMBRANE WATERPROOFING



NERVASTRAL Sheeting being installed for Membrane Waterproofing of foundations of a large government building in Florida.



Installing NERVASTRAL H-D over roof of a utilities tunnel on the West Coast.

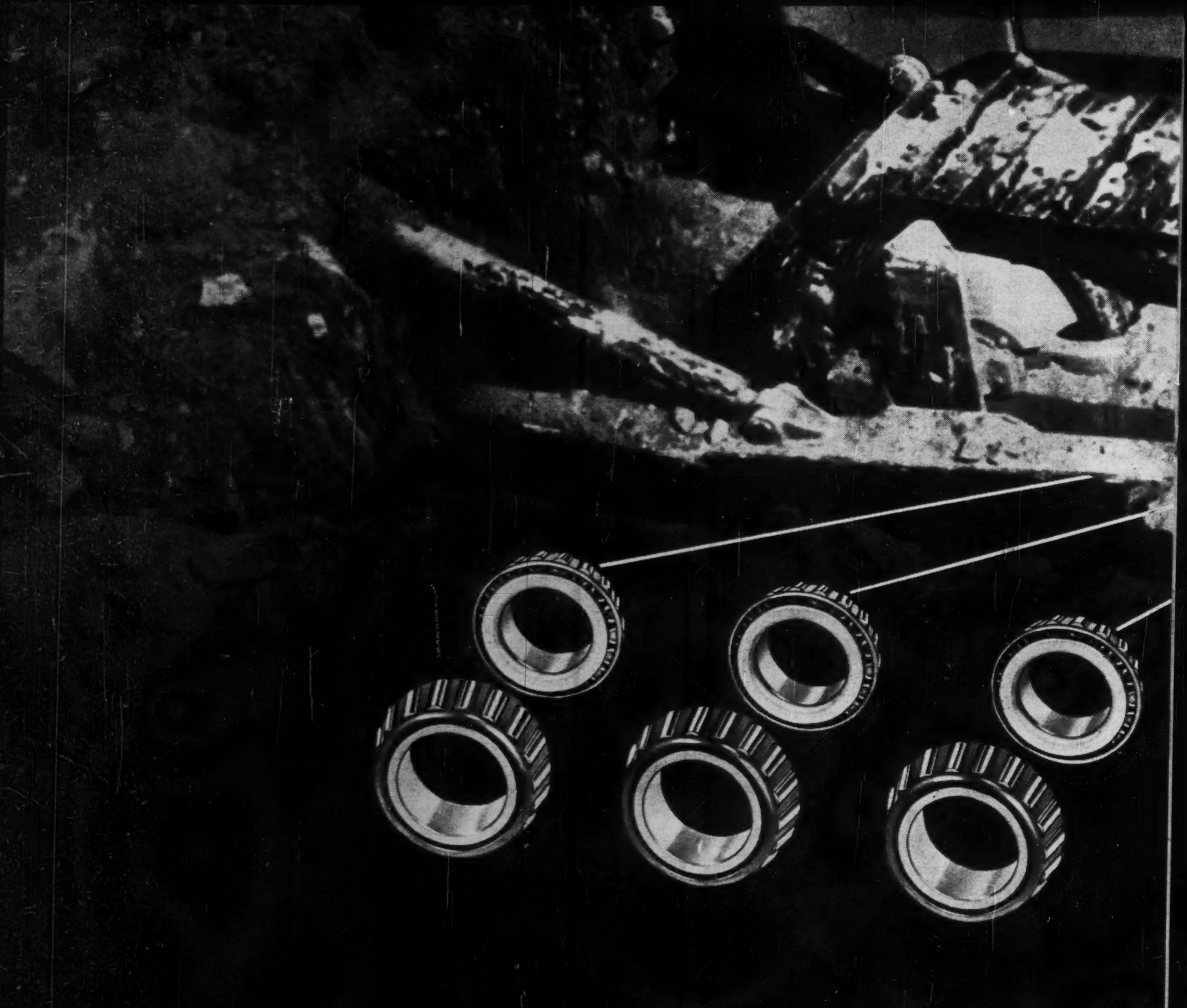
As the pioneer in the application of chemistry and engineering to waterproofing problems, Rubber & Plastics Compound Co., has developed and coordinated a group of related products and application systems which afford builders the utmost in the prevention of water penetration above and below grade. This company not only fabricates products designed for easy, economical installation but is also organized to furnish the engineering know-how to help you apply these products to assure the highest degree of impermeability.

Nervastral Seal-Pruf H-D Sheeting, shown in all three photos, is a long-lasting, impermeable plastic material that has many unique advantages when used for membrane waterproofing. It is inexpensive to apply, is not subject to fungi, mildew and chemical attacks, has resilience, is flexible at low temperatures, and has high abrasion and tear resistance. In waterproofing hard-to-do vertical areas, Nervastral Sheeting is less expensive and easier to apply.

"NERVASTRAL," "NERVA-PLAST" and "NERVA-KOTE" are proprietary names for a variety of waterproofing products that are favorably known to many architects, engineers and builders. Write for technical details and outline any special waterproofing problems for which you wish answers.

RUBBER & PLASTICS COMPOUND CO., Inc.
Time & Life Building • Rockefeller Center • New York 20, N. Y.

CIRCLE 25 ON READER SERVICE CARD



MORE WORK POWER

Reduced friction through use of tapered roller bearings in all Allis-Chalmers crawler tractors makes the difference in work power and profit for you!

All Allis-Chalmers crawler tractors roll on tapered roller bearing truck wheels. Most others still use bushings.

Anyone who remembers his roller skating days knows the performance advantages of bearings over bushings. The difference between first and also-ran was in the wheel bearing. This friction-reducing advantage is the reason railroads all over the country have turned to *roller* freight.

The same principle applies to tractors except much more power is being wasted by friction-type plain bushings. It's one of the reasons the 225-hp HD-21, on tapered roller bearings, produces right alongside the biggest tractors you can buy. Can you

move ahead with

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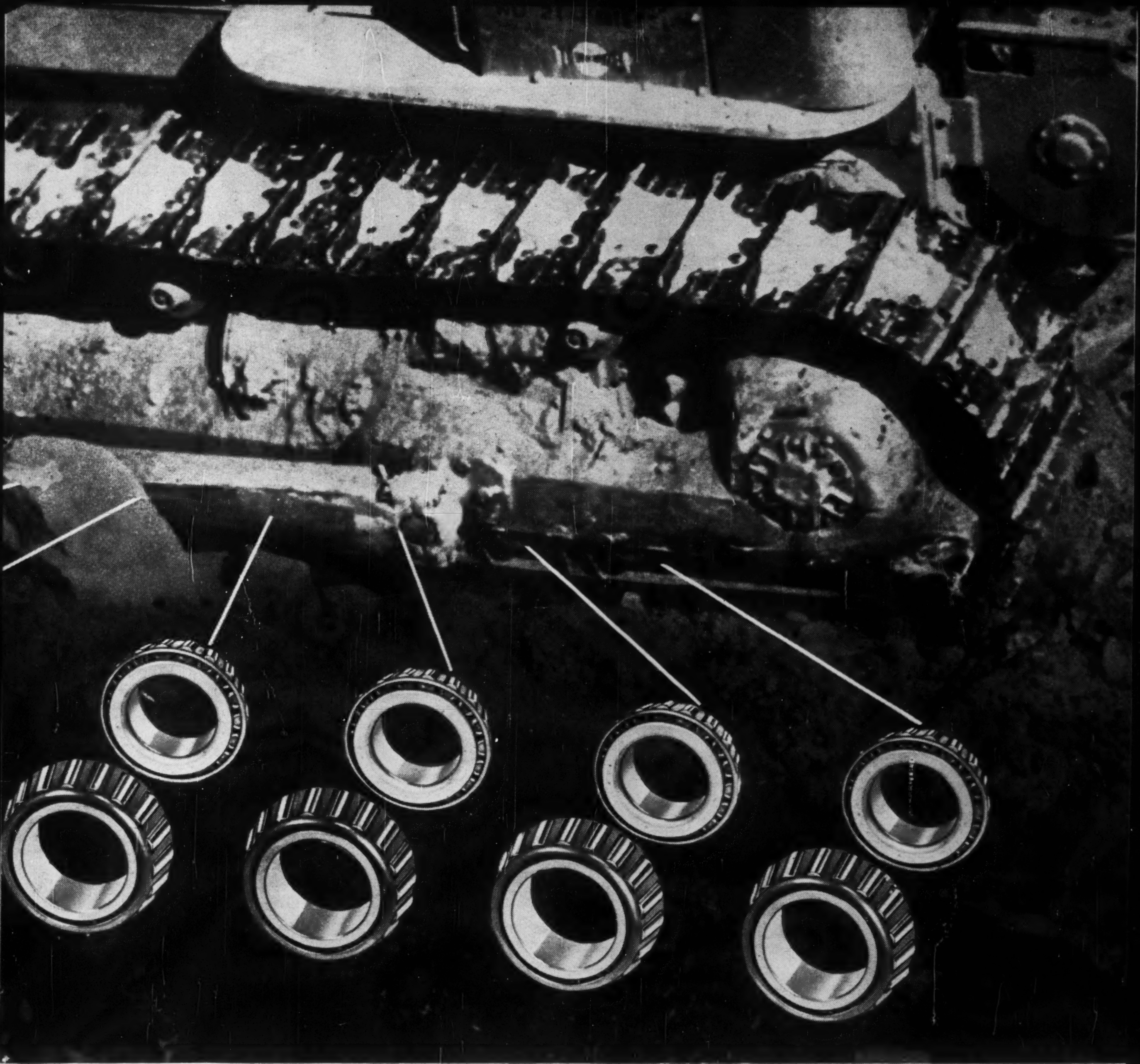


PER HORSEPOWER

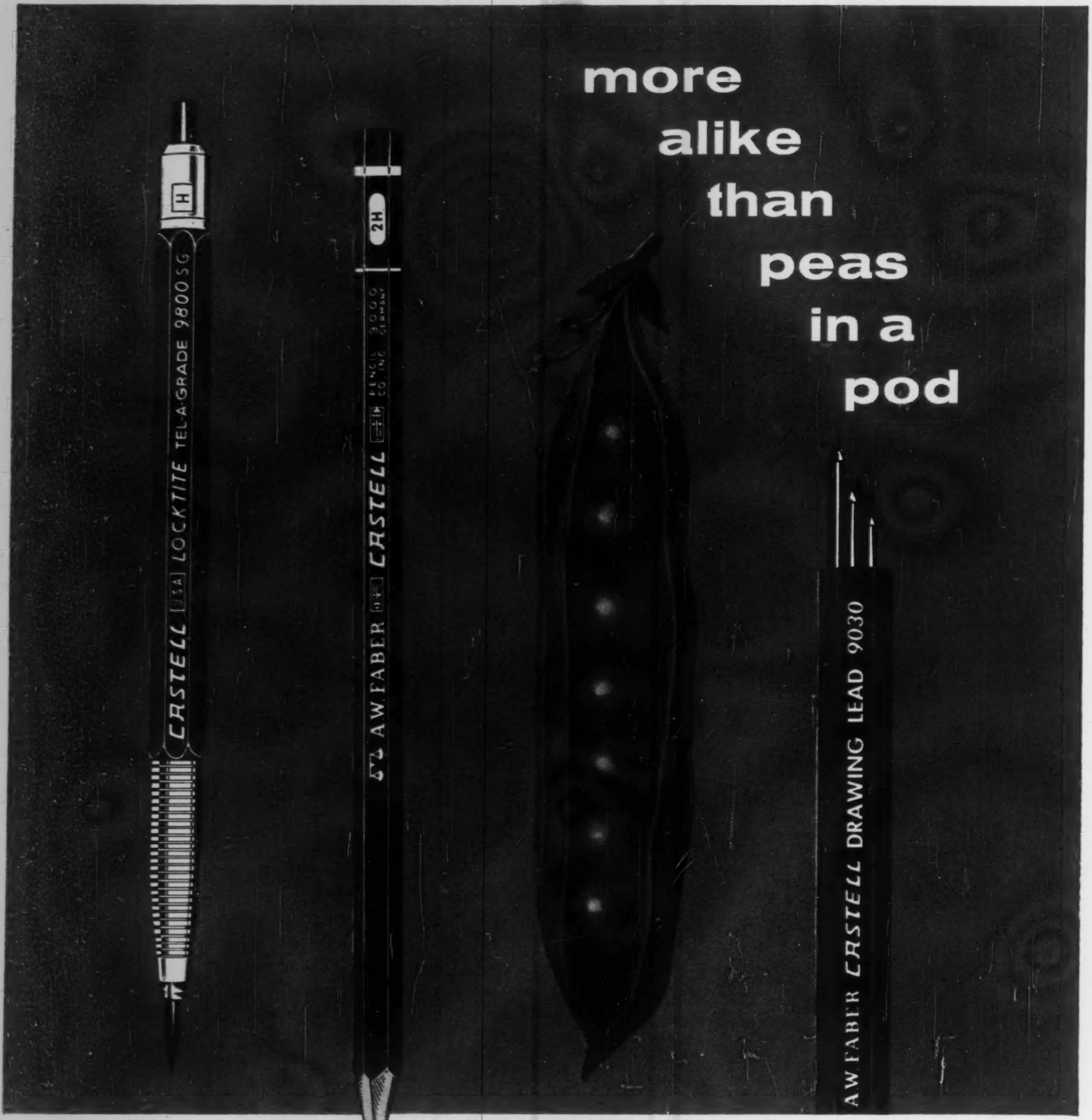
continue to pay for power that *never* produces—that gets "lost" in old-fashioned bushings?

Your Allis-Chalmers dealer will be glad to discuss this and the many other advantages that keep the HD-21 on the go shift after shift with a minimum of maintenance. Ask about the *toughest track ever built . . .* the *industry's healthiest engine* and *certified permanent lubrication*. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

Now available
in Persian Orange
or Allis-Chalmers Yellow
at no extra cost.

ALLIS-CHALMERS

power for a growing world


more alike than peas in a pod
H
CASTELL USA LOCKTITE TEL-A-GRADE 9800 SG
2H
A.W.FABER CASTELL
A.W.FABER CASTELL DRAWING LEAD 9030

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Pencil Co., Inc., Newark 3, N. J.

Our Bicentennial year—1761-1961
200 years of uninterrupted
manufacturing experience.

We asked engineers, architects, designers and draftsmen this question: *"What irritates you most in a drawing pencil?"*

Many of them said, *"A degree that suddenly changes its character. You start your drawing with a 2H. When it wears out, you reach for another 2H — but this one draws like a 3H."*

This can never happen with CASTELL. Its grading is so rigidly controlled, you can go back to your unfinished drawing months — or even *years* — later, without any perceptible change in line or color. It produces the same image density and sharpness of detail. No peas in a pod can match the consistent uniformity of CASTELL's superb 20 degrees, 8B to 10H. Draws perfectly on all surfaces, including CRONAR and MYLAR base films. Join the masters of *your* profession. Buy CASTELL, call your dealer today.

#9800 SG Locktite Tel-A-Grade *Lead Holder with no-slip, functional grip that's kind to tired fingers ■ Bull dog clutch ■ Unique degree indicator ■ Carries 2-year guarantee ■* **Castell Drawing Leads #9030,** *identical in grade and quality with world-famous Castell drawing pencil ■ Usable in all standard holders, but perfect for Locktite ■ 7B to 10H, and a kaleidoscope of colors ■*

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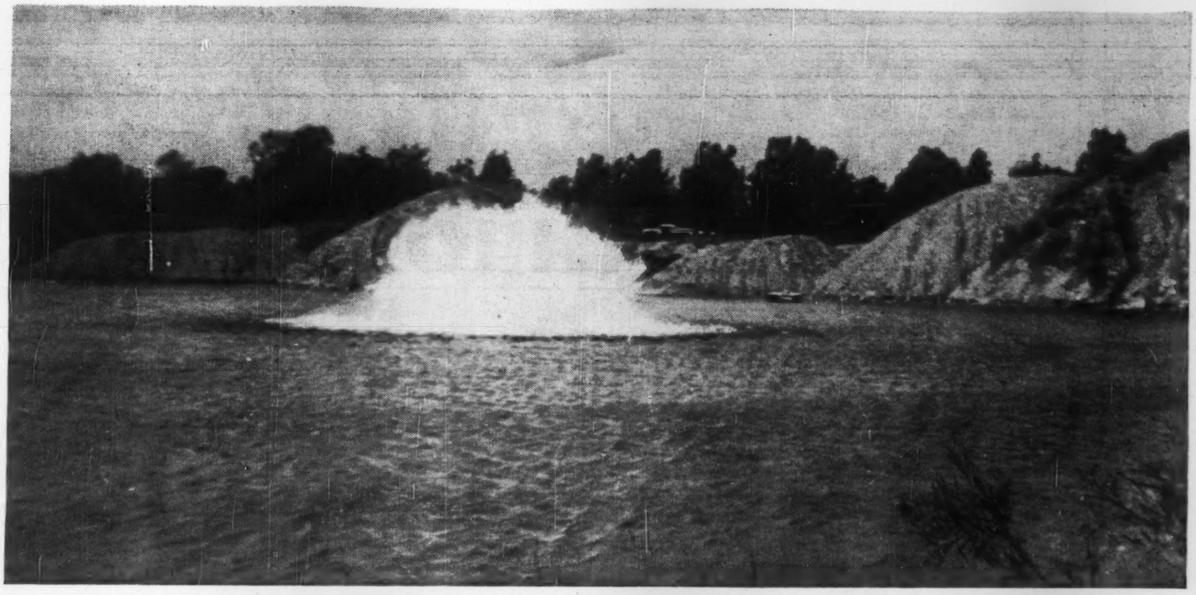

Only Spencer uses military type underwater tests to determine the relative effectiveness of commercial explosives. These tests are the latest in a continuing research program conducted by Spencer Chemical Company, the pioneer supplier of solid ammonium nitrate as an ingredient in blasting.

Precise new underwater testing method shows . . .

Spencer N-IV And Fuel Oil Produces Up To 7 Times As Much Useful Energy Per Dollar

. . . when compared with gelatin dynamites

How do you measure the true blasting effectiveness of commercial explosives? Unsatisfied with present methods, Spencer Chemical Company and a well known research organization teamed up to discover a better way.

After extensive investigation Spencer adopted underwater testing methods developed through military research. These were found to provide data better related to commercial blasting than any other testing method. As a result, more accurate standards of evaluating the actual useful output of explosives have been developed.

Latest test results show that Spencer N-IV Ammonium Nitrate and fuel oil deliver up to seven times as much useful energy per dollar as gelatin dynamites (see chart at right).

Extensive research has also shown that Spencer N-IV, when mixed with the recommended 6% fuel oil, delivers 20% to 25% more blast energy than equal charges of other solid ammonium nitrate-fuel oil mixtures. There are two main reasons for this: (1) lower density which provides greater ease of detonation, (2) special prill structure which allows fuel oil to be absorbed more evenly.

It costs you nothing to get the full benefits of Spencer's advanced knowledge and experience in this field. Just mail this coupon. No obligation of course.

PERFORMANCE COMPARISON OF BLASTING MATERIALS

Explosive	Heaving Energy Ft. Tons/Lb.	Shattering Energy Ft. Tons/Lb.	Effective Energy Ft. Tons/Lb.	Useful Energy Ft. Tons/$
Spencer N-IV and Fuel Oil	423	60	483	14,230
40% Gelatin Dynamite	257	115	372	1,770
60% Gelatin Dynamite	384	84	468	1,800

SPENCER®

Spencer Chemical Company
Industrial Ammonium Nitrate Sales
407 Dwight Building • Kansas City 5, Missouri

Without cost or obligation, please send me the latest information on the use of Spencer N-IV and fuel oil for blasting.

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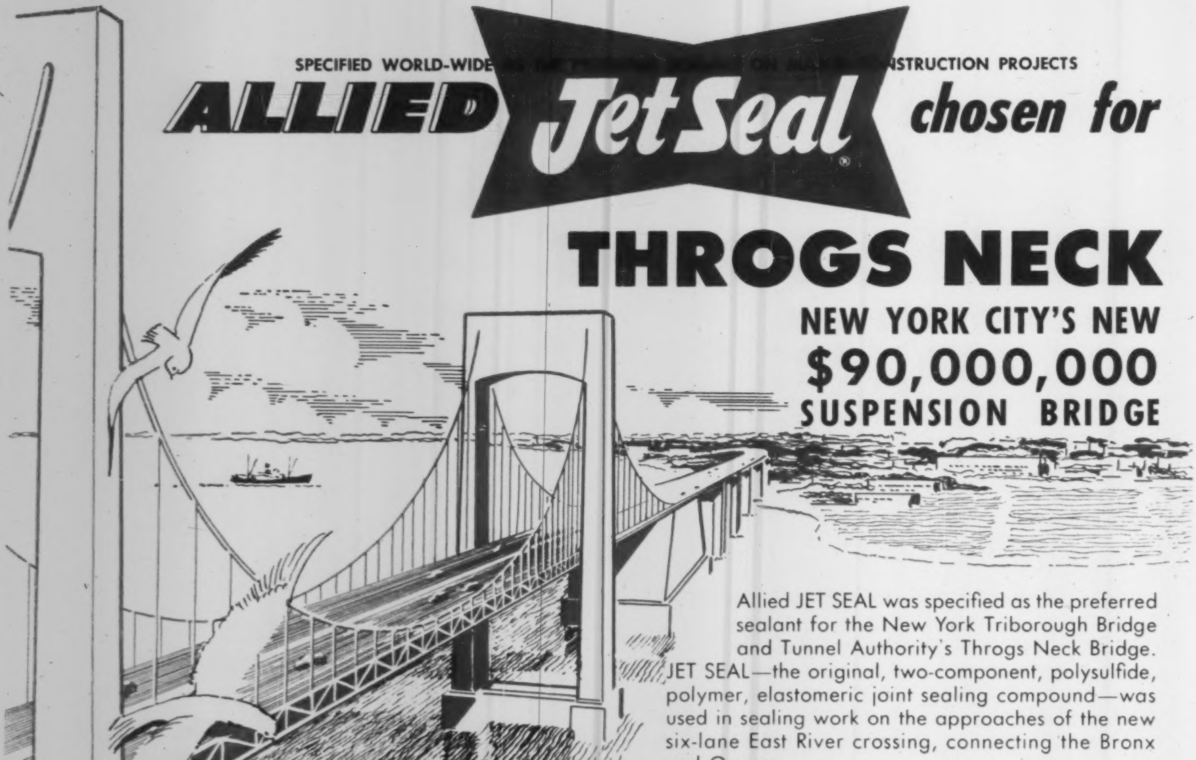
CIRCLE 29 ON READER SERVICE CARD

SPECIFIED WORLD-WIDE AS THE PREFERRED SEALANT ON MAJOR CONSTRUCTION PROJECTS

ALLIED Jet Seal® chosen for

THROGS NECK

NEW YORK CITY'S NEW
$90,000,000
SUSPENSION BRIDGE



Allied JET SEAL was specified as the preferred sealant for the New York Triborough Bridge and Tunnel Authority's Throgs Neck Bridge. JET SEAL—the original, two-component, polysulfide, polymer, elastomeric joint sealing compound—was used in sealing work on the approaches of the new six-lane East River crossing, connecting the Bronx and Queens.

The Queens Approach of Throgs Neck Bridge, from Pier Q2 to the anchorage deck, showing the viaduct slab being cured.

FACTS ABOUT THROGS NECK

- Long approach viaducts: Bronx side 6,000 ft. in length; Queens side 3,400 ft. in length
- 1800 ft. main span • Side spans 555 ft. in length
- Height of bridge tower: 360 ft. above water
- Under clearance: 142 ft. at mid-span, 135 ft. at the towers
- Requires 60,000 tons of steel
- 3 years to complete. Open to traffic January 11, 1961.

Construction Engineers Specify ALLIED Jet Seal Because...

- JET SEAL has no flow, even at elevated temperatures (200°F).
- JET SEAL is ideally suited for sealing vertical and overhead joints, without special preparation.
- JET SEAL will prevent penetration of water into joints.
- JET SEAL is highly resistant to highway salts.
- JET SEAL will prevent incorporation of incompressible materials.
- JET SEAL has positive adhesion, cohesion, resilience and ductility at low temperatures (−20°F).
- JET SEAL is quick curing—construction can be opened to *all* traffic within one hour.
- JET SEAL's two special Applicators (Models 8591-D and X-691-E) apply the materials in one fast continuous operation.

Designed to handle the most tedious sealing jobs, under the most severe conditions, the Allied-Stroud Applicators are the only authorized equipment for the application of Allied JET SEAL.

FOR MORE INFORMATION ABOUT Allied JET SEAL, and the ALLIED-STROUD APPLICATORS, Write to:

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MATERIALS CORP.

PRODUCERS, REFINERS AND COMPOUNDERS OF SPECIAL ASPHALT AND COAL TAR PRODUCTS

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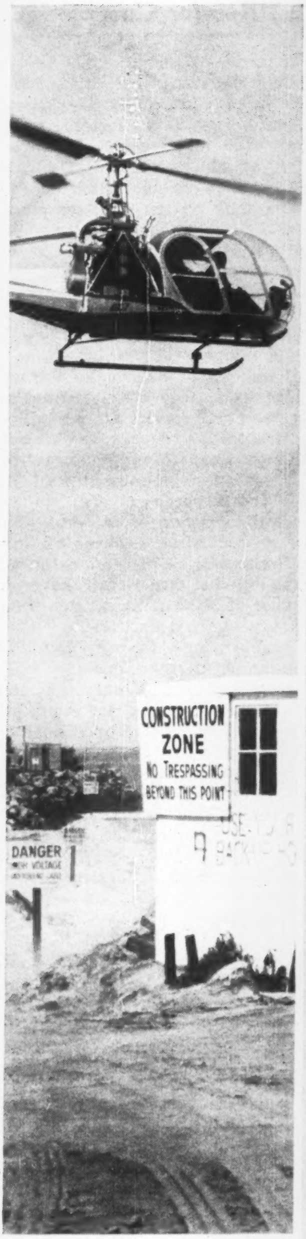
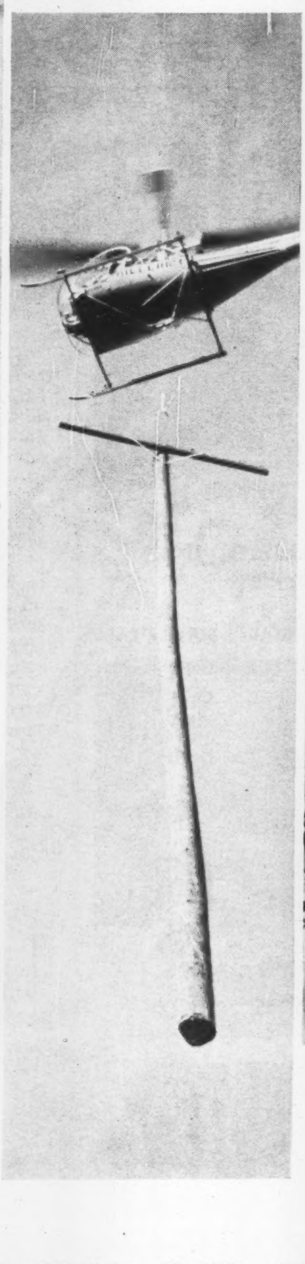
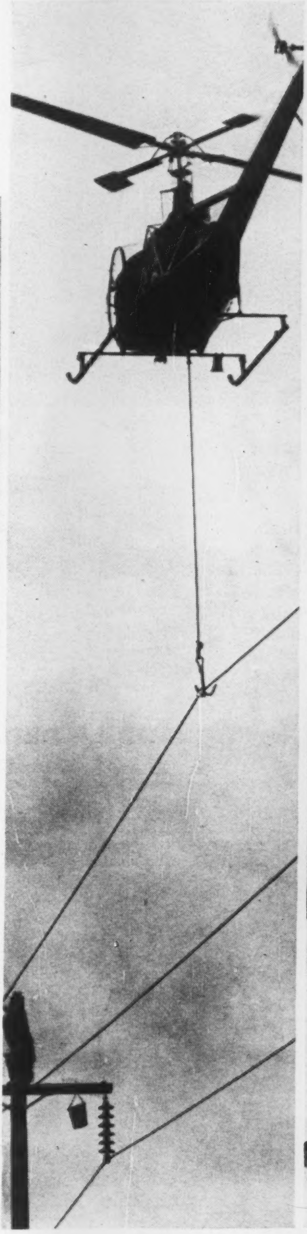
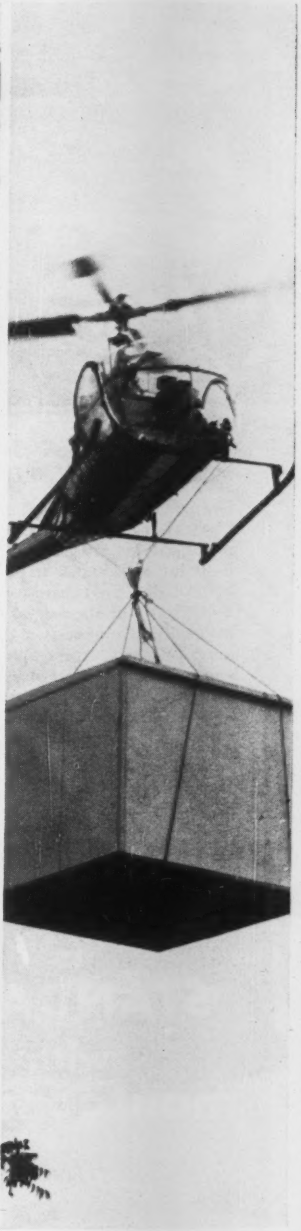


Send for the new Hiller brochure, "On Target," the latest, most comprehensive guide to helicopters in missile site support. **Contact: Hiller Sales Manager, Hiller Aircraft Corp., Palo Alto, Calif.**







POWER TO CLIMB . . . TO CARRY . . . TO PULL . . . TO LIFT . . . IS BASIC TO HELICOPTER PERFORMANCE. POWER TO PULL OUT OF TIGHT SPOTS – STRAIGHT UP AND FAST – IS BASIC, TOO, TO HELICOPTER SAFETY. IT MAKES SENSE, THEN, FOR MEN IN MISSILE SITE CONSTRUCTION AND SUPPORT TO CONSULT HILLER, MANUFACTURER OF THE 12 E AND E4 – MODERN PERFORMING, FIELD PROVEN HELICOPTERS WITH MORE USABLE POWER THAN ANY OTHERS IN THEIR CLASS. THE HILLER E4, FOR EXAMPLE, IS THE ONLY FOUR-PLACE HELICOPTER WITH THE SAFETY RESERVE OF POWER TO CLIMB – STRAIGHT UP – FULLY LOADED – AND AT A SPEED OF 820 FEET PER MINUTE.

HILLER
AIRCRAFT CORP.
PALO ALTO, CALIFORNIA
SUBSIDIARY OF THE ELECTRIC AUTOLITE COMPANY

CIRCLE 31 ON READER SERVICE CARD

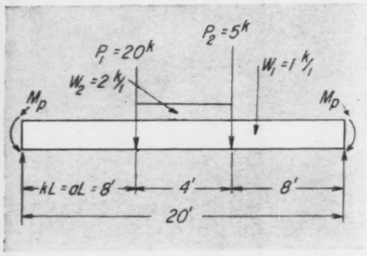
and South America that this method can be used successfully if properly managed. The real factors which motivate the engineering firms and agencies which resist contractors' alternatives must be that their fee for the work may be too small to permit review of the alternatives, they may not wish to be in the position of having the owner able to compare the cost of the contract design with the cost of other designs or they may not wish to trouble themselves with the review of alternate designs.

It is difficult to believe, in this age of high taxes, that some responsible engineers in civil service are not willing to permit contract changes which would result in savings to the taxpayer but would not lower the quality of the work. Actions such as this do not enhance the position of the profession.

The procedure of allowing contractors' alternatives is a professional means of assuring the owner will have the advantage of a basic design on which all bidders can bid and possibly make additional savings through modifications proposed by the bidders.

Alternatives should only be considered when the savings are more than sufficient to pay for the additional engineering expended by the owner's engineers in reviewing the proposed modifications. This procedure will result in better and more extensive engineering in major projects and cannot result in work of lower quality as long as the owner's and contractor's engineers conduct themselves in a professional manner.

JAMES R. LIBBY
San Diego, Calif.



Plastic Boundaries

SIR—When you roughly check the formulas in Mr. Peterson's article "Master Formulas for Plastic Design" (ENR Feb. 2, p. 65) you find that they cannot be checked at their boundary conditions. A simple example, when you substitute $k = a < b$ into the formulas for interior span you get

for Case 1

$$M_p = \frac{w_1 a^2 L^2}{4} + \frac{P_1 aL}{2}$$

for Case 3

$$M_p = \frac{w_1 a^2 L^2}{4}$$

(*Reader Comment continues p. 35*)

the man who
backs his skill
with Mobile Drill
has a head start on
any job he wants!

TOUGH FLORIDA CORAL NO MATCH FOR THE "EXPLORER"

Deep in the Everglades, Alonzo Cothron of Islamorada, Florida relies on his tractor-mounted B-40 for a $250,000 payoff. The lightweight, hydraulic-powered B-40 gives him unequalled mobility and performance on difficult job locations . . . plus options to auger, core or bore blast holes *fast* in tough tropical coral.

The B-40
pays off in profits.
Write today for details!

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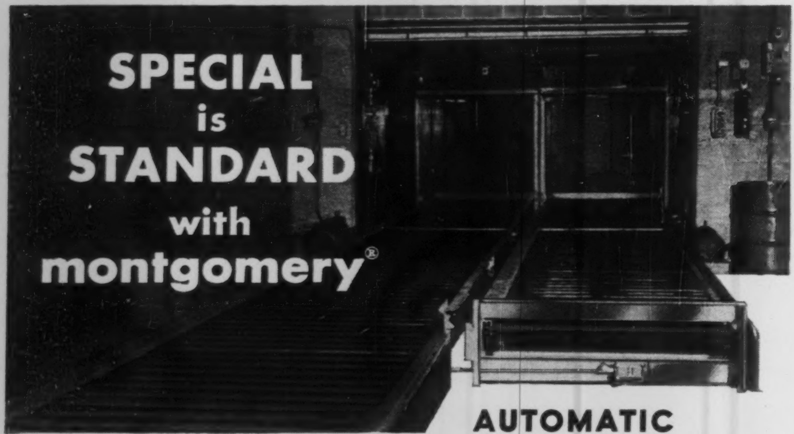
CIRCLE 4 ON READER SERVICE CARD



Design and construction of unusual industrial elevator installations such as these palletized material handling units are regular events for Montgomery engineers. Equally unusual requirements have been met to provide elevators for giant testing machines; for cross-over bridges; for the nation's leading parking garages. Unusual, yes, but you can depend on Montgomery for all types of elevators, including attendant and self-operated electric and hydro-electric passenger and freight elevators.

AUTOMATIC MATERIAL FLOW

into and out of specially designed Montgomery Elevators installed in midwest refinery of one of the nation's leading oil companies. Power driven roller conveyors, built in the elevator car floors, turn until car is loaded . . . doors close and car proceeds to floor indicated . . . levels automatically, doors open automatically and conveyor starts again to unload car.

MONTGOMERY Dependable ELEVATORS

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ELEVATOR COMPANY Moline, Illinois
Exclusive Manufacturers of Passenger and Freight Elevators for over Sixty-Eight Years
Offices in Principal Cities

MONTGOMERY ESCALATORS • STEPHENS-ADAMSON SPEEDWALKS AND SPEEDRAMPS

CIRCLE 32 ON READER SERVICE CARD

U.S.F. & G. bonds more construction – year in, year out – than any other insurance or surety company.

THE USF&G

United States Fidelity & Guaranty Company, Baltimore 3, Md. • **Casualty - Fire - Marine Insurance • Fidelity - Surety Bonds**

SPAN-POWER*

Deep South Assignment: Make detail shop drawings and fabricate the steel for a tortuous, tri-level interchange, linking three major New Orleans thoroughfares.

Three MVSS plants at Melrose Park (Chicago), St. Louis and Chattanooga teamed up to fabricate and deliver the steel "in good time—well ahead of schedule!" That's MVSS Span-power!

26 rivers, highways and railroads spanned by MVSS in 17 months.

*** MVSS HAS IT!** 1100 men and their manpower . . . six completely equipped fabricating plants . . . three erection companies . . . generate MVSS *span-power*.

Louisiana's Carrollton Avenue-Airline Traffic Interchange, New Orleans during construction—2,689 tons of MVSS steel fabricated for five "bridges" and 4,857 lineal feet of banked elevated roadway with a complicated curvature.

Superstructure Contractor:
John F. Beasley Construction Company.
Engineers: Modjeski & Masters.

Curvatures, varying elevations and super-elevations complicated the geometry of these elevated roadways. Expansion bearings required precisioned fabrication of steel in exact U-curves.

MISSISSIPPI VALLEY
STRUCTURAL MV SS STEEL COMPANY
SERVICE

Six Strategic Plants. Chicago (Melrose Park) • St. Louis, Mo.
Flint, Michigan • Lansing, Michigan • Decatur, Ill. • Chattanooga, Tenn.

© 1960 MVSS CO., Decatur, Illinois

CIRCLE 34 ON READER SERVICE CARD

The same phenomena can be found in the end-span formulas. I hope Mr. Peterson will explain why it happens, because in general this phenomena indicates something wrong in the derivation of the formulas.

HUG-CHIAO CHENG
Mississippi Valley Structural Steel Co.
Melrose Park, Ill.

SIR—An interesting problem develops if k equals a. If a is substituted for k the formulas for M_p are different for Case 1 and Case 3. Nevertheless, I believe they are both correct.

For example, solving the k formula for Case 1 ($b > k > a$) for the beam diagram above yields $k = a = 0.4$. Computing the value of M_p with this value of k yields $M_p = 96$ ft-kips. This result can be checked by solving the freebody diagram for the left portion of the beam.

For Case 3, k must be greater than ½, which is not true for Case 1. As an example of Case 3 set $w_1 = 1$ kip per ft, $w_2 = 2$ kips per ft, $a = 0.7$, $b = 0.9$, $P_1 = 6.67$ kips and $P_2 = 4$ kips Solving the k equation for Case 3 yields $k = a = 0.7$. M_p works out to 49 ft-kips.

F. G. ERIC PETERSON
Consulting Engineer
Albany, Calif.

Too Much Steel

SIR—The 200,000-ton figure you used Jan. 26 (p. 32) on structural steel for the Paradise plant is an error out of this office.

Here are the correct figures on structural steel to be used in the two-unit Paradise plant:

Powerhouse for units 1 and 2	20,000 tons
Office and service bay	1,600 tons
Switchyard and transformer yard	350 tons
Total	21,950 tons

PAUL L. EVANS
Director of Information
Tennessee Valley Authority
Knoxville, Tenn.

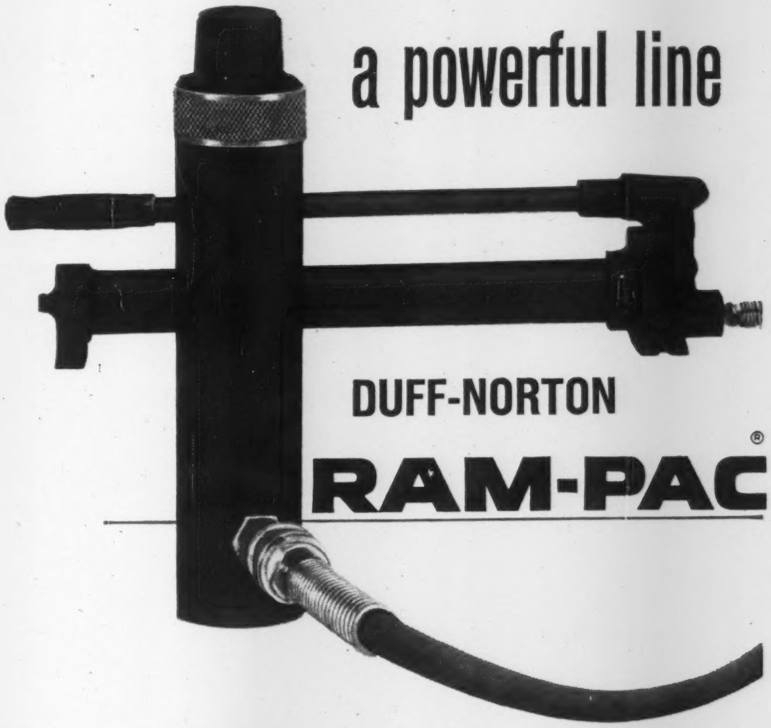
For Your Calendar . . .

American Welding Society, annual meeting and welding show, Commodore Hotel and the New York Coliseum, New York City, April 17-21. Write: Arthur L. Phillips, 33 W. 39th St., New York 18, N. Y.

Western Association of State Highway Officials, annual conference, Flamingo Hotel, Las Vegas, Nev., April 23-28. Write: C. S. Eiche, Reservations Chairman, State Highway Office Building, Carson City, Nev.

Metals Engineering Conference, Metals Engineering Division of the American Society of Mechanical Engineers, Penn Sheraton Hotel, Pittsburgh, Pa., April 23-25. Write: ASME, 29 W. 39th St., New York 18, N. Y.

16th Purdue Industrial Waste Conference, Purdue Memorial Center, May 2-4. Write: Don E. Bloodgood, Chairman of Conference, Purdue University, School of Civil Engineering, Lafayette, Ind.

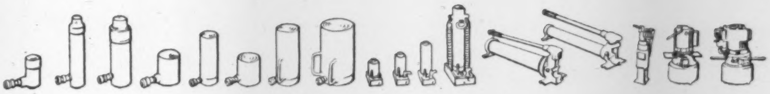


a powerful line

DUFF-NORTON

RAM-PAC®

HYDRAULIC RAMS AND PUMPS—12 RAMS, 5 PUMPS, CAPACITIES 10 TO 100 TONS



The complete Duff-Norton Ram-Pac line gives you the power source you need—where you want it and with little effort.

The 12 rams may be used with hand or power pumps to apply from 10 to 100 tons of force in any direction in either portable or permanent applications.

They are used to adjust, test, bend, pull, push and lift—also in hydraulic jigs, fixtures and presses. Multiple ram units may also be used in unison.

The five Ram-Pac pumps include 2 hand pumps, an air hydraulic pump, an electric pump and a gasoline powered pump. For information on this powerful, versatile Ram-Pac line of rams, pumps, attachment units, accessories and fittings ask your distributor or write for Bulletin AD-90.

DUFF-NORTON JACKS

DUFF-NORTON COMPANY
Four Gateway Center, Pittsburgh 22, Pennsylvania
The Canadian Duff-Norton Co., Ltd., Toronto 6, Ontario

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

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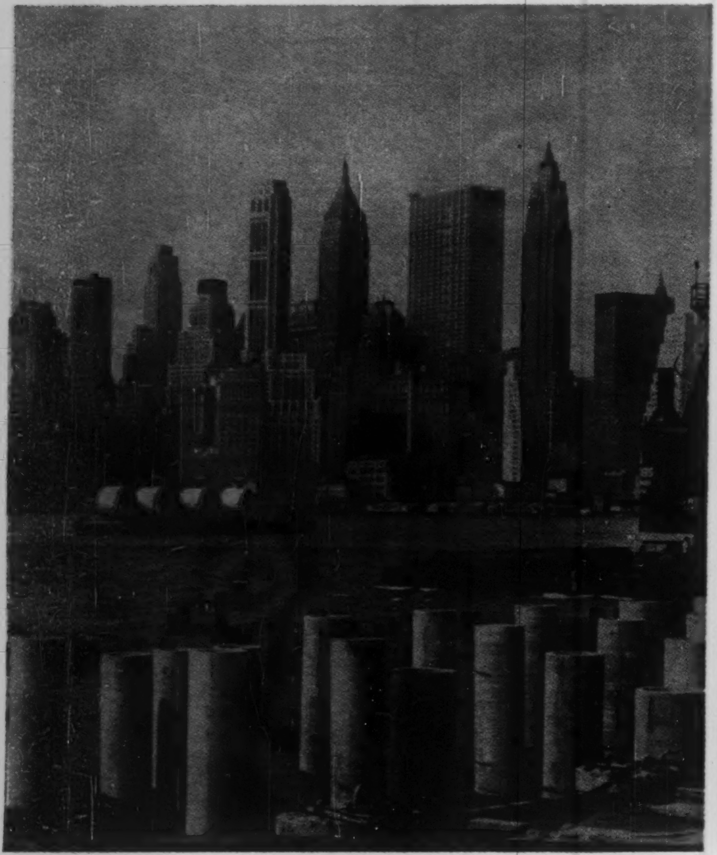
METROPOLIS OR MOUNTAIN TOP



PILE SLEEVE OR PIPELINE

LOCK JOINT PIPE COMPANY products for a variety of purposes are offered on a world-wide market. The majestic New York skyline looks down on a bargeload of 144" Lock Joint Concrete Subaqueous Pipe en route to a metropolitan sewer outfall project, as well as on Lock Joint Concrete Pile Sleeves being installed for the Port Authority's pier construction program.

15,000 feet up on the bleak slopes of the Andes, the installation of 40 miles of Lock Joint Concrete Pressure Pipe made vital water available to the Southern Peru Copper Company's $300,000,000 mining enterprise.

So it is throughout the world. Lock Joint products are bringing fertility to the Negev Desert. Additional water flows to thriving Cape Town through a Lock Joint supply line. Lock Joint transmission and distribution mains as well as sewer lines help meet greatly increased demands in booming Caracas. These are only a few of the thousands of communities at home and abroad served with complete satisfaction by Lock Joint Pipe Company.

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East Orange, New Jersey
Member of the AMERICAN CONCRETE PRESSURE PIPE ASSOCIATION
Sales Offices: Chicago, Ill. • Columbia, S.C. • Denver, Col. • Detroit, Mich. • Hartford, Conn. • Kansas City, Kan. • Perryman, Md. • St. Paul, Minn. • Winter Park, Fla.
Pressure • Water • Sewer • REINFORCED CONCRETE PIPE • Culvert • Subaqueous

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ENGINEERING NEWS-RECORD

Vol. 166, No. 12 March 23, 1961

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Back issues of ENGINEERING NEWS-RECORD *are generally available for the previous six months. Semiannual indexes will be sent on request.* ENGINEERING NEWS-RECORD *is also indexed in the Applied Science & Technology Index, Business Periodicals Index and the Engineering Index.*

THE CONSTRUCTION WEEK

ITSCHNER TO INDUS—From the top job of guiding river development work in the U.S., as Chief of Army Engineers, to the top job of guiding the great Indus Basin development program in Pakistan is the course chosen by Lt. Gen. Emerson C. Itschner. Following retirement from his Chief of Engineers post next week, he becomes top engineer advisor to West Pakistan Water and Power Development Authority.

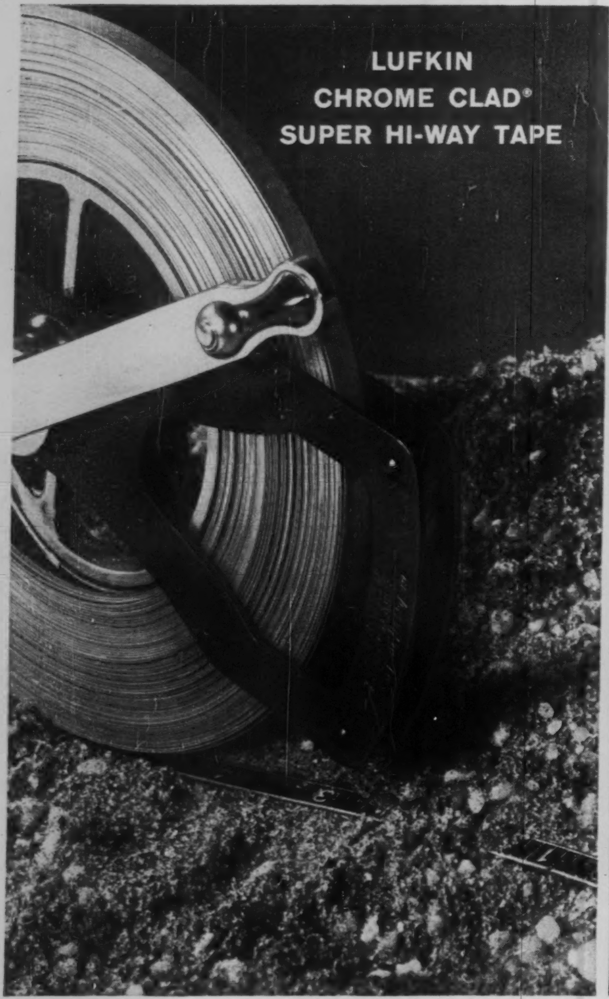
'SOMEBODY GOOFED'—That's the only explanation Indiana officials could find last week for a situation that will delay for two years a $24-million highway program for the Indianapolis area. A bill setting up the program vanished somewhere between the Indiana legislature, where it was passed, and the governor's desk. Unsigned, the bill cannot become law; the legislature has adjourned and won't reconvene for two years; and should the stray bill be found, the deadline for the governor's signature has passed.

TELEGRAM BEATS MIMEOGRAPH—Ingersoll Rand took to the telegraph office last week to win a press-release race with Gardner-Denver by one day. Both equipment manufacturers are heralding production of a portable screw-type air compressor (see p. 141). Ingersoll Rand, which for several years has produced a wide range of such compressors for idustrial installations, will make its portable in the 1,200 cfm class; Gardner-Denver's product will be in the 125-, 600- and 900-cfm classes.

TEXAS TOWER REPERCUSSIONS—Three Air Force officers face the prospect of punishment for "dereliction of duty" in the Texas tower accident that took 28 lives on January 15. The Air Force made the announcement on Monday, but did not specify what "dereliction" the officers committed. The charges involve "the manner in which they performed their duties during the period immediately prior to the disaster." A report on why the tower toppled is yet to come.

MAINTENANCE COSTS GO UP, UP, UP—Rising maintenance costs threaten state highway programs, say members of the Mississippi Valley Conference of State Highway Officials. The 14 state highway departments expect 1961 maintenance costs to rise from 10 to 30% over 1960.

Rx FOR COMMUTER RAILROADS: MONEY—Federal loans of $650 million to $800 million at low interest for capital improvements and reduced taxes were prescribed early this week for ailing commuter railroads in the New York metropolitan area. The advice was the result of a study by the Regional Plan Association of New York City for the Senate Interstate and Foreign Commerce Committee.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CHROME CLAD®
SUPER HI-WAY TAPE

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CHROME CLAD
STEEL
THE LUFKIN RULE CO.
SAGINAW, MICH. U.S.A.

Exclusive LUFKIN Chrome Clad® lines defy sand, mud, grit, and years of use!

Engineers and construction workers swear by 'em. Because the bold, black markings are *bonded* to steel . . . protected by layer on layer of electroplating . . . topped by a final coat of chromium!

Exclusive quality features are yours in *all* Lufkin tapes. For example:

Lufkin Super Hi-Way (above, left) is built to *last.* A real drag tape. Raised markings and protective borders are part of the tape! Can't come off! And special steel resists kinking. Available in 100′, 200′ and 300′ lengths.

50-ft. Anchor Chrome Clad (above, right) is available with easy-to-read markings in feet, tenths and hundredths, in genuine-leather, hand-stitched case. The handiest thing you can carry, on job after job.

See your Engineering Supply House now . . . for the Lufkin tape that's designed for *your* kind of work.

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WASHINGTON OBSERVER

- **Air Force tightens base control**
- **Renewal and roads get together**
- **CAB pushes for regional airports**

- **Management of ICBM base construction is being reshuffled to centralize control.** A Ballistic Systems Division is being set up by the Air Force to run the program. Included in the new unit will be both the Air Force's development and procurement phases of the missile program and the Ballistic Missile Office of the Army Corps of Engineers.

Brig. Gen. Alvin C. Welling of the Engineers will become "deputy for site activation" in the new division. He will be in charge of facility design and construction, and installation activities—under the operational control of the Air Force. The shift was made with approval of the Secretary of the Army but the Corps' outgoing Chief, Lt. Gen. E. C. Itschner (see p. 37), was not consulted in advance.

The Pentagon tells contractors and bidders to continue to deal with the offices with which they have been dealing unless and until they are advised of changes as the reorganization takes effect in detail.

—

- **Machinery has been established by the Commerce Department and the Housing and Home Finance Agency for joint planning of highways and urban redevelopment in metropolitan areas.** A policy-making joint steering committee, four members from HHFA's Urban Renewal Administration and four from Commerce's Bureau of Public Roads, already is functioning.

Regional committees of representatives of both agencies also have been named and will cooperate with state and local bodies to expedite activities. First of a series of regional meetings will be held in Philadelphia, Chicago, Fort Worth and San Francisco.

—

- **The Kennedy Administration is trying to encourage the idea of centrally located regional airports to serve groupings of small cities.** This is being resisted by smaller communities that already have airports, but chairman Alan S. Boyd of the Civil Aeronautics Board says civic pride is going to give way to technology and economics.

Jets cannot operate economically on short hops. And insufficient traffic is being generated to cause the CAB to force airlines to serve all these communities. The solution, says Mr. Boyd, is regional airports served by a network of high-speed highways.

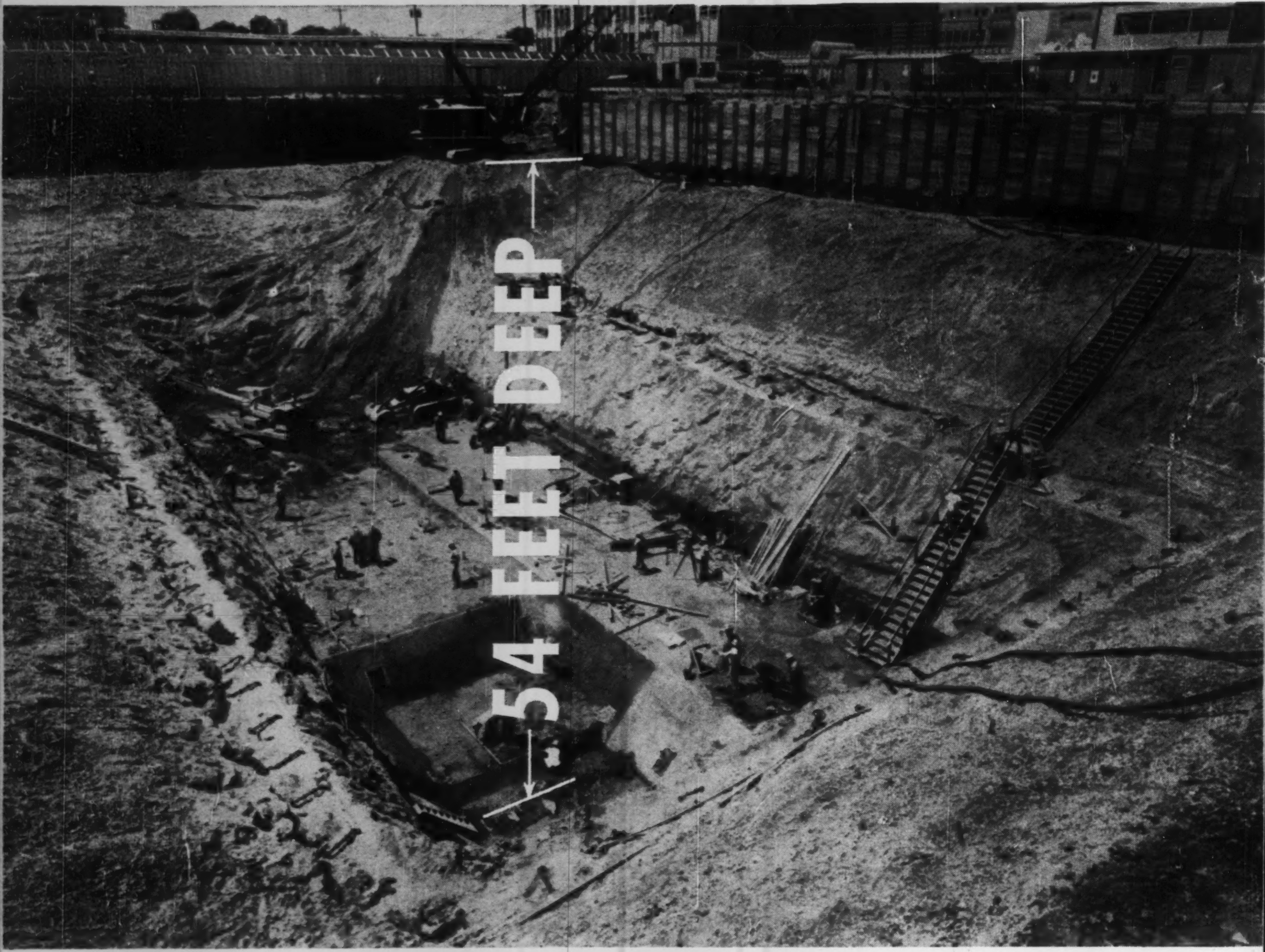
The Administration is willing to consider federal aid for construction of airport terminals at regional airports, says Federal Aviation Administrator Najeeb Halaby. Otherwise, aid will be limited to runways and safety features (ENR Mar. 16, p. 25).

—

- **The Defense Department is cracking down on selection of contractors who build Capehart housing units.** The move is an aftermath of contractor Hal B. Hayes' defaults on $46.7 million worth of construction at five military bases (ENR Mar. 16, p. 75). The purpose: to tighten screening of bidders.

A surety bond requirement is being considered for submission with original bids and cash deposits. Officials concede that such a requirement would not necessarily have barred awards to the firm that defaulted. But they believe it may be a good first step toward greater selectivity. Each of the services is reviewing Capehart contracting procedures to come up with other recommendations.

MORETRENCH PUMPING BONEDRIES FOUNDATION



Contractor: W. S. Bellows Const. Corp., Houston

Pumping Contractor: American Dewatering Corp., Houston

A forty-four story office building for the Humble Oil and Refining Company is being constructed in Houston, Texas, on the foundation pictured above.

Because of the great depth, a specially designed Moretrench ejector system, supplemented by a Moretrench Wellpoint System, was used to control 34 feet of water and to relieve the hydrostatic pressure in the underlying strata below subgrade.

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Battle Joined on Road Financing

- **House Ways and Means Committee hears testimony for and against President's highway tax proposals.**
- **Federal Highway Administrator reveals data from AASHO road test to support increased levies on heavy trucks.**
- **Administration repudiates earlier Bureau of Public Roads' claim that some costs should be borne by non-highway-users.**

The House Ways and Means Committee began deliberating this week whether to approve, reject or modify President Kennedy's controversial formula for raising an extra $9.7 billion to keep the Interstate Highway Program on schedule.

The committee concluded six days of hearings on Tuesday, but a final decision is not expected until next week. Chances are a compromise will emerge.

The committee is expected to:

- Agree with President Kennedy that the full 41,000-mile Interstate program should be completed by 1972 as scheduled without any cutback or stretchout.
- Sustain Mr. Kennedy's position that the pay-as-you-go principle of financing be retained and that neither a deficit spending nor borrowing scheme be used.
- Modify Mr. Kennedy's tax proposals for raising the $900 million per year in additional revenue required. The President wants about two-thirds of the extra money to come from canceling a scheduled July 1 reduction in the federal gas tax from four to three cents a gallon. The rest would come from tax increases that would fall most heavily on big trucks.

Odds are that the committee will go along with continuing the four-cent gas tax. But the reaction of its members during the hearings indicated they may disagree with the President's request to raise truck taxes so sharply, and with his insistence that highway users bear all of the new tax burden.

The committee's final decision may turn on its members' view of two heated controversies touched off during the hearings. One injected the AASHO road test squarely into the tax battle. The other developed over the Bureau of Public Roads' conclusion of last January that non-users should be assessed 8% of the tax burden for federal-aid roads—a judgment repudiated now by President Kennedy.

The controversies had their beginning in the President's highway message to Congress. But they grew louder after the Administration's top brass—Treasury Secretary Douglas Dillon, Commerce Secretary Luther Hodges, Budget Director David Bell and Highway Administrator Rex Whitton—appeared before the committee and filled in details.

Rex Whitton touched off a dispute when he testified that Mr. Kennedy's proposal for sharply higher truck taxes is based on preliminary results from the two-year, $27-million AASHO road test at Ottawa, Ill. This came as a surprise because, although the test ended last November, its politically and economically potent findings weren't supposed to be ready until early summer.

Lineup on the President's Highway Financing Proposals:

FOR

American Road Builders Assn.
National Governors Conference
American Municipal Assn.
AGC
AFL-CIO
National Assn. of County Officials

NEUTRAL

AASHO
Chamber of Commerce

AGAINST*

American Trucking Assn.
American Automobile Assn.
American Petroleum Inst.
National Tire Dealers and Retreaders Assn.
Various state highway user conferences
Teamsters Union

**Against at least one key element of plan.*

BPR had so informed Congress two months ago—before Mr. Whitton took over. It said then that delay was unavoidable because of the long time required to analyze the mass of data from the lengthy test. And in submitting its highway cost allocation study a little later, the bureau left out the so-called incremental method of determining what vehicles should pay what costs because the method would rely largely on the AASHO test results.

But Mr. Whitton said the Kennedy Administration had since settled on the incremental method as the "most sound" of four ways to compute highway cost allocations and that enough AASHO results were available to work out preliminary equations for such computations.

"It is our opinion that any change in results once the final road test equations are available will not be very great," he said.

The incremental method figures the cost of building a highway for an automobile, then how much more it costs incrementally to design and construct the road to accommodate progressively heavier trucks and buses.

Although the incremental method was left out of the January cost allocation study, BPR gave Congress information on three other methods: gross ton-mile, cost function, and differential benefit.

(The ton-mile method is based on the concept that payments toward highway costs should be in proportion to the weight of the vehicle and the distance traveled. The cost function method divides cost responsibility into separate categories assignable to traffic volume and the weight of the vehicle, or both. The differential benefit method allocates costs in proportion to benefits, such as reduced operating costs, reduced travel time, etc., derived from use of the highways by vehicles of varying sizes and weights.)

Mr. Whitton told the committee that the incremental solution bears "much less heavily on the larger vehicles than do those indicated by the gross ton-mile and cost function studies, but considerably more heavily than the findings of the differential benefit study."

In relying on preliminary AASHO test data to back up its tax proposals, the Administration touched off loud protests from opponents of the President's program and prompted questions from the Ways and Means Committee. Issue quickly developed over whether the admittedly incomplete data were adequate or accurate enough to work out even tentative equations under the incremental method.

The American Trucking Association, whose members stand to be hit hard by the Kennedy tax proposals, raised quick and strong objections.

The other surprise of the hearings was the Administration's outright repudiation of BPR's conclusion that non-users should be assessed for about 8% of the cost of federal-aid highways. This judgment was also a part of the bureau's cost allocation study.

In his message to Congress, the President said the basis of this BPR finding was "open to serious challenge." But Budget Director Bell went further. He said "indirect approaches" and "unproven assumptions" had been used by the bureau in measuring non-user benefits. He particularly criticized the bureau for not offsetting the federal costs it assigned to non-users by their contributions through local property taxes toward the state share of federal-aid highway costs and their "even greater contributions" toward locally financed roads and streets.

As the hearing ended, Ways and Means Committee members found themselves under pressure rivaling almost any likely to develop at this session of Congress.

On the one hand, they were being pressured to approve the tax increases, not only by the White House, but also by organizations representing the nation's governors, mayors and county officials, plus the AFL-CIO, the American Road Builders Association, and the Associated General Contractors. On the other, they were being urged to reject the proposals or water them down drastically by the truckers, the oil-gas industry, the American Automobile Association, the tire industry and the teamsters union.

The American Association of State Highway Officials and the U.S. Chamber of Commerce supported the President's goal of completing the Interstate system on schedule but took a neutral position as to how the required extra revenue should be raised.

If Congress fails to act on the Kennedy tax program by June 30, the gas tax will drop from four to three cents per gallon under existing law. The loss of this money from the Highway Trust Fund would be offset, however, by a diversion of $800 million from the general treasury. The funds diverted would represent a portion of the federal excise taxes on automobiles and accessories.

The diversion would last for only three years, however, and President Kennedy has branded it fiscally irresponsible. He says it would amount to taking money out of one pocket and putting it in another because the hole left in general treasury funds would have to be filled somehow.

The strongest protest against the Kennedy tax proposals came from the truckers. ATA's spokesman said the increases would be "disastrous," putting many truck firms already operating on a thin profit margin out of business. Furthermore, he said, the effect of this would be to reduce the money available for the highway program.

The American Municipal Association, representing 13,000 city, town and village governments, told the committee it supported Mr. Kennedy's financing proposals but would be amenable "to other sound financing proposals" which the committee might adopt.

President D. H. Bray of AASHO testified that it is "essential that the presently designed Interstate system be completed not later than 1972" but followed traditional AASHO policy of not making any recommendations regarding financing.

Highway Administrator Whitton told the committee that the $9.7 billion in new revenue sought by Mr. Kennedy would make possible additional apportionments of $11.6 billion in federal funds toward the Interstate system. The apportionment to be made this year for fiscal 1963 would be increased to $2.4 billion and increased annually thereafter to a maximum of $3 billion for the fiscal years of 1968, 1969 and 1970 with a balancing apportionment of $2.9 billion for fiscal 1971.

Without the new revenue, the 1963 apportionment will have to drop to $2 billion and those for 1964 and 1965 would be further reduced to $1.5 billion, with gradual increases thereafter to $1.9 billion for fiscal 1968 and 1969 and a balancing apportionment of $1.6 billion for fiscal 1970.

During his testimony, Mr. Whitton was asked "what happens in 1973" after the present Interstate system is supposed to be completed. He replied that "the need for a road program will continue for some time to come," implying that an expansion of the Interestate program should be contemplated later.

And as the House Ways and Means Committee deliberated where the dollars would come from, the Public Works Committee opened hearings on the Fallon bill, which would authorize the extra money contemplated in the Kennedy formula for finishing the Interstate on time.

Columbia Pact Under Cloud

A near-billion-dollar international construction job in the Pacific Northwest may die aborning if Canada fails to heal an internal split.

Almost immediate starts on four big Columbia Basin dams—three in Canada, one in the U. S.—hang on the outcome.

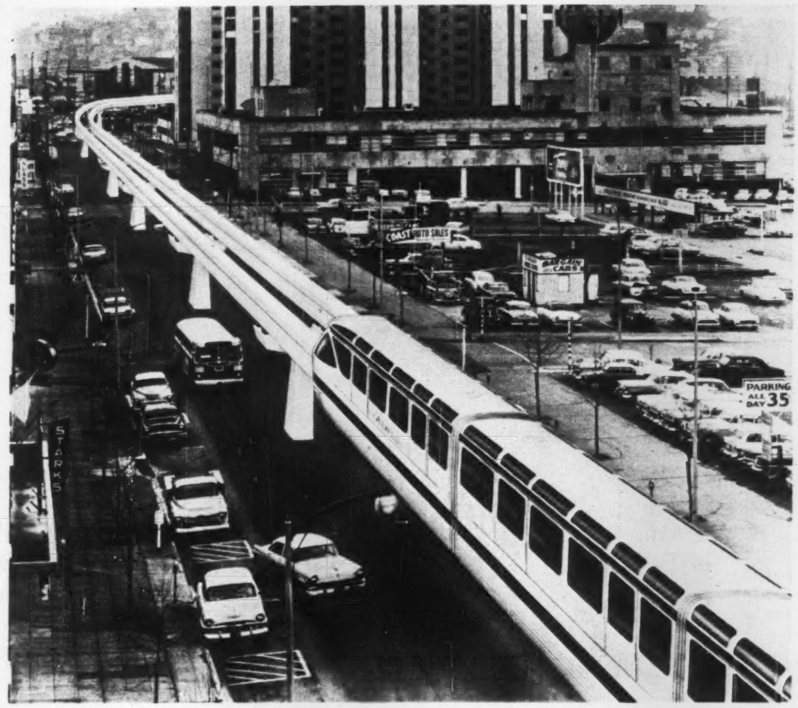
The focus of the rift is the proposed Columbia River treaty for joint development of the basin's hydropower and flood-control potential. The pact won the enthusiastic endorsement of former President Eisenhower and Prime Minister John Diefenbaker in January (ENR Jan. 26, p. 29) and last week got almost unanimous approval (90 to 1) by the U. S. Senate. But to the dismay of Canadian federal officials, ready to press for immediate ratification by Parliament, British Columbia is demanding a delay.

The issues are not crystal clear, but a vital element in British Columbia's lukewarm attitude toward the Columbia plan is the rival Peace River hydro scheme. This development is proposed by a private group called the Peace River Power Development Corp. under the guiding hand of Swedish industrialist Axel Wenner-Gren.

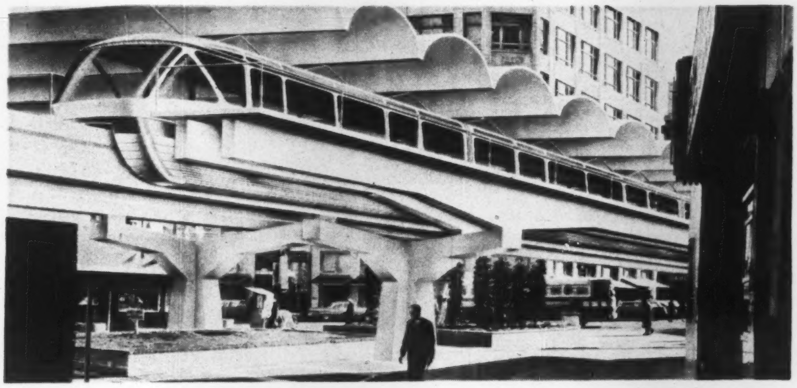
Provincial officials right now are armed with a treaty delay recommendation from the B. C. Energy Board, a committee set up last December by British Columbia Premier W. A. C. Bennett to investigate comparative consumer power costs of the two schemes. In an interim report this month, the board said Canada should not ratify the treaty until more information is obtained on engineering plans and consumer costs. The board said it had asked the B. C. Power Commission, the provincial government agency that would operate the Columbia project, to speed up development studies.

Canadian federal officials feel that the province is reneging at the last minute on an understanding.

However embarrassed Ottawa may be, it is powerless to overrule British Columbia without raising political hackles in all the provinces. Issuance of water licenses is a provincial function under the Canadian constitution.



Crystal ball view of Seattle's future shows a monorail line . . .



. . . and a downtown station as part of the Century 21 Exposition.

Seattle Previews Its Monorail

Seattle got a preview last week of the $4.2-million monorail system that will shuttle the mile between the city's business district and the Century 21 Exposition in 95 seconds.

Alweg Corp. of Sweden, designer and owner of the system, revealed the design of the high-speed, electrically powered monorail trains and the precast concrete tracks on which they will travel.

Light-weight trains mounted on rubber tires will ride saddle-style on twin concrete tracks, according to Sixten Holmquist, Alweg managing director. Single concrete columns, 4-ft square at street level, will support the 5,200-ft-long dual monorail tracks.

Two trains of four cars, one operating on each track, will carry passengers to and from the exposition. The maximum load for each train will be 450 persons. The system is planned for a capacity of 10,000 passengers an hour.

Construction is scheduled to begin next month. Completion is set for November.

Each track will be 3 ft wide and 5 ft deep, precast in 120-ft sections. Tapered supporting columns will be spaced at 85-ft intervals on the straightaway and at 60 ft on curves. The average clearance under the monorail beam will be 21 ft.

Cars of each train will connect with each other through sliding doors. Body shells of the cars will be of light-metal alloys.

The cars will straddle the rails. Each car rides on two sets of running gear. Each running gear is a single axle bogie consisting of two pairs of upper and one pair of side wheels. The upper wheels carry the load and the side wheels provide guidance and stabilization.

At the downtown terminal, Westlake Station, a moving belt will carry passengers from street level to the overhead loading platform. A series of curved aluminum panels will serve as roof for the platform. The exposition grounds station will be at ground level and it, too, will have an aluminum panel roof.

The two trains that operate on the system's two tracks are designed for two-directional running, with a driver's cab at each end. On arrival at a terminal, a train simply reverses itself to return to the other terminal.

An Alweg subsidiary, Alweg Rapid Transit Systems of Washington State, Inc., will design and supervise the monorail project. The Howard S. Wright Construction Co., of Seattle, will build the structure. Although the cars' driving mechanism, braking system and other mechanical components are manufactured in the U. S., the bodies will be produced in West Germany.

City Official Rebuts State Graft Charges

New York City Buildings Commissioner Peter J. Reidy last week condemned as legally worthless the charges of graft in his department contained in a report by the State Investigation Commission (ENR Jan. 19, p. 24).

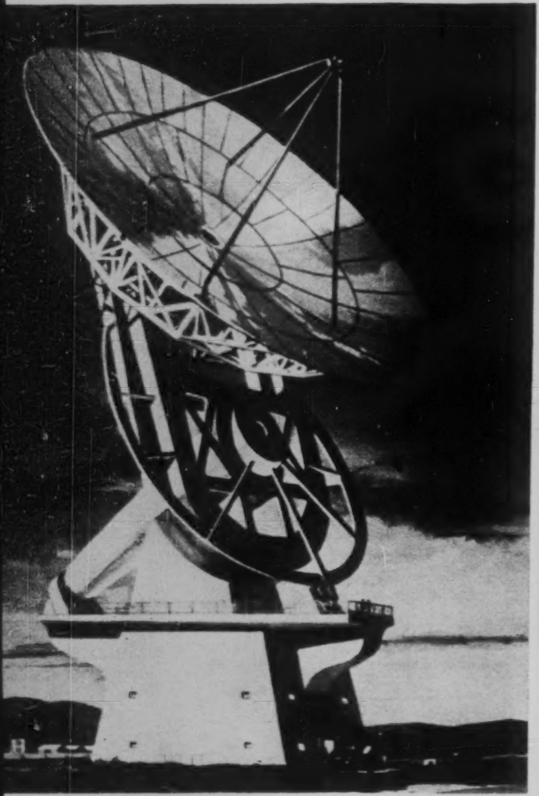
Mr. Reidy said that the unsworn statements of two architects, whose testimony the state investigators had cited as evidence, were not legal evidence. According to Mr. Reidy, one architect, invoking the Fifth Amendment, refused to confirm his unsworn statement; the other could not furnish specific dates and circumstances under which he says he bribed Buildings Department personnel.

All of the accused employees denied under oath receiving bribes from either architect, said Mr. Reidy.

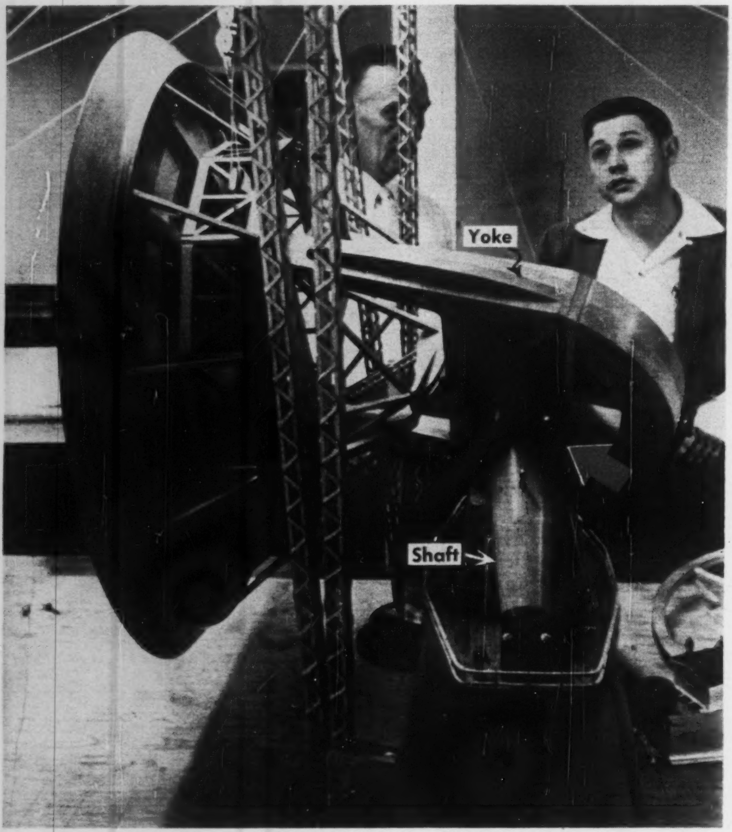
Mr. Reidy also reported that during the past year he had conducted 22 disciplinary hearings, resulting in six employee dismissals, five suspensions and five fines. All of these hearings were initiated within the Buildings Department according to Mr. Reidy.

A serious personnel shortage still handicaps his department, said Mr. Reidy. In the Plan Examining Division, 23 vacancies, with top salary $10,300, remain unfilled.

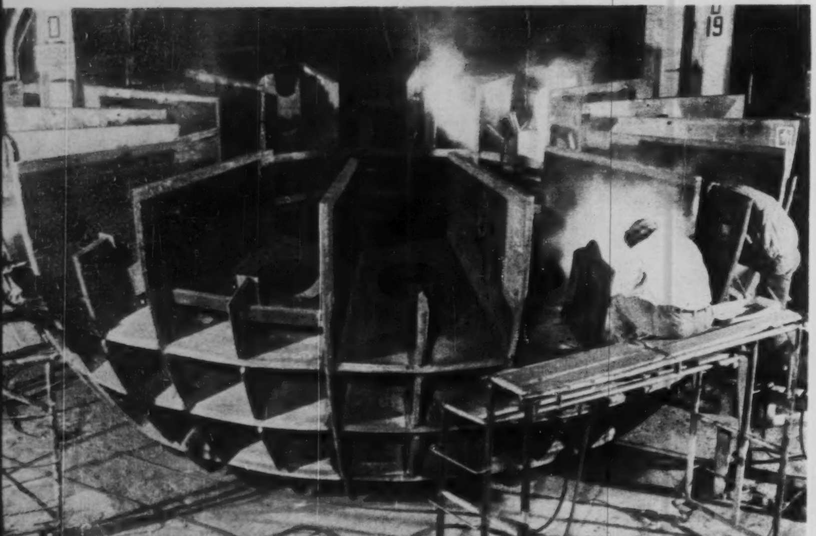
Telescope Erection



BEHIND SCHEDULE—This radio telescope will be finished years late.



CAUSE—Spherical bearing (arrow), a key support, is source of delay.



WELDED GRID for bracing the main bearing cracked during fabrication. Erection could not proceed until repairs were completed.

BEARING SURFACE consists of 16 curved plates. On-site machining will take seven months.

Delayed: It All Hinges on a Bearing

Fabrication difficulties may delay the 140-ft-dia radio telescope at Green Bank, W. Va., by as much as three years—and it may end up costing about double the original estimate.

The structure had been planned for completion this year at a cost of about $5 million. Best estimate now is late next year or perhaps mid-1963.

E. W. Bliss Co., Canton, Ohio, the contractor, is now negotiating to shift to a cost-plus-fixed-fee contract from the fixed-price contract awarded in 1958. Bliss fabricates sections of the radio telescope in its Canton plant for shipment to the site. There, Darin & Armstrong, Inc. of Detroit assembles and erects the sections under a $2.5-million subcontract with Bliss.

The Green Bank telescope, which is sponsored by the National Science Foundation, is about 40 miles from the Navy's "big ear," under construction at Sugar Grove, W. Va. The Navy's job, a 600-footer, has also run into trouble (ENR Nov. 3, 1959, p. 19).

• The plan—The 140-ft-dia parabolic antenna will be rotated by a polar axis shaft 67 ft long and 12 ft in diameter. This shaft will sit on a huge concrete base and will be aligned parallel to the earth's north-south axis. A steel yoke about 78 ft long and 57 ft wide will be attached to the top of the shaft and will carry the declination shaft, which also turns the antenna.

The 2,500-ton weight of the big aluminum dish and its supports will be transmitted to three supporting pads on the concrete base through a hemispherical steel bearing, 22 ft in diameter, at the upper end of the polar axis shaft. The bearing, machined to within 0.005 in. of a perfect sphere, will be attached to the shaft, which passes through an opening in the bearing to receive the yoke.

• The troubles—Since the superstructure is carried by the 22-ft-dia bearing, erection cannot proceed until the bearing has been fabricated and set in place. But the bearing has been troublesome from the beginning.

Its design calls for a curved, 4-in.-thick steel plate, braced inside by a grid of steel plates. All connections were to be welded. Steel specified is similar to ASTM A373.

Under a subcontract, Lukens Steel Co., Coatesville, Pa., forged the curved plate in 16 pieces and welded them together in pairs. Bliss was to fabricate the internal grid for welding to these eight pieces.

The grid is formed of steel plates 2 to 6 in. thick. It was to be held within a tolerance of ¼ in.

When Bliss tried to assemble the grid by welding, cracks developed. Before the job was finished, a total of seven cracks were found in the 2-in. plate. All had to be chipped out, welded and stress-relieved immediately.

J. A. Lindberg, Bliss division manager, says: "The problem causing this delay was fundamentally a material specification choice coupled with a fixed design concept aimed at a minimum of deflection—a condition that could have produced brittle failure. Manifestations of this problem were experienced during fabrication in the form of weld cracking in heavy, rigid steel members. Fabrication methods used proved satisfactory and would not have been changed even if current analysis were known at the start of fabrication."

By last August, Bliss was able to weld the curved plates to the grid. The bearing then was in the form of two quarter-spheres, each weighing 50 tons. They were ready for shipment to the site, where the two components were to be welded. However, the project's consultants now feared that brittle fracture might develop if this method of joining were used.

• A possible solution—A committee headed by Augustus B. Kinzel, vice president for research, Union Carbide and Carbon Corp., was formed to study the problem. Its report, submitted early this year, recommended not only that the bearing parts be bolted together but also that the bearing be bolted, not welded, to the polar axis shaft.

To make bolting possible, the bearing must be modified so that a 3-in. bolting flange can be welded on; 2½-in.-dia bolts will be used for the connection. Also, the octagonal polar axis shaft will be built up to a circular shape for a length of about 11 ft and bolting flanges attached. Bliss estimates that the alterations can be made and the bearing shipped to the site within six months, if the committee's recommendations are approved soon. About five months will be required for preparing the shaft to receive the bearing. After the bearing is attached, it will be milled to a 0.005-in. tolerance—a seven-month task. (It will take about 50 hours to make one cut.)

• More troubles—Bliss also ran into trouble in fabricating the 85-ft-dia ductile-iron gear for rotating the polar axis. Specifications require a 0.001-in. tolerance between teeth and 0.005-in. over any 12-tooth sector. Bliss initially had trouble keeping an even temperature in the machining area to maintain dimensional control. The fabricator eventually solved the problem by establishing fixed measuring points. In process for about one year, the huge gear should be ready for shipment within the next two months.

The 70-ft-dia declination gear, made of bronze, did not develop this trouble. It will be completed by July.

Meanwhile, Darin & Armstrong is putting finishing touches to the telescope's reinforced concrete base, which had been started in October 1958. The field men have not worked continuously. For one thing, there was a year's delay because of a design change—a 30-ton welded plate bearing for the polar axis shaft, which was to be seated atop the pedestal, later was required to be embedded in the concrete; work was held up pending delivery of the weldment to the site. Furthermore, erection of the superstructure could not proceed until the 22-ft-dia bearing was completed.

The polar axis shaft and yoke components now are at the site awaiting assembly.

Associated Universities, Inc. of New York City is in charge of the project under a management contract with the National Science Foundation. Ned L. Ashton of Iowa City was the consulting structural engineer.

Award Schedule Delayed On Potomac Interceptor

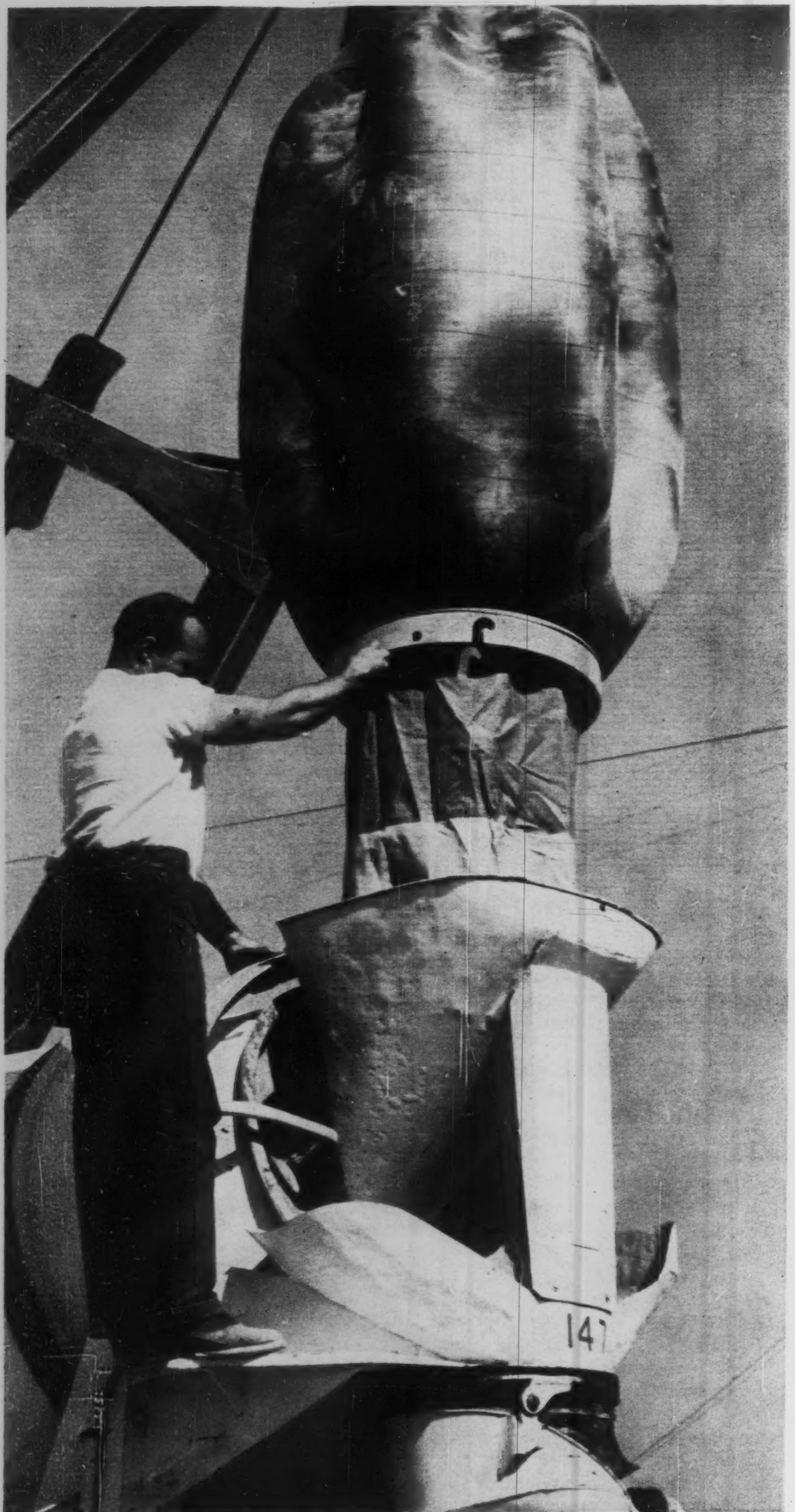
A hard winter in and around the nation's capital has caused postponement of the initial construction awards for the $28-million Potomac Interceptor, which will link Dulles International Airport with the Washington, D. C. sanitary system.

A persistent snow cover that frustrated aerial surveys and core boring to be provided for prospective bidders has caused a 90-day delay of awards scheduled for this month and May.

The District of Columbia Department of Sanitary Engineering, charged with building the airport interceptor under a 1960 congressional mandate, has pushed back the award schedule to June and July, but the full $25-million schedule of contracts for the 35-mile main line should be under way by the end of the year.

The first two sections, to be let in June, will cost about $5 million and $2.5 million respectively. A second pair of awards, slated for July, will total around $3.75 million.

Instant Concrete in Bags: Add



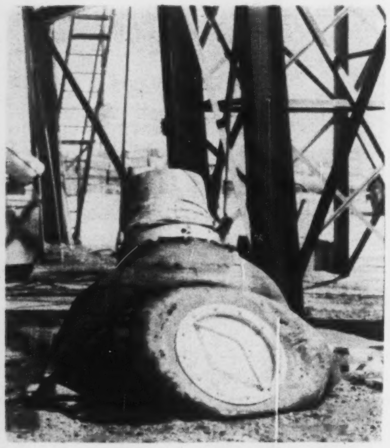
Producers and users of concrete before long may transport all the ingredients for a batch, including water, in a re-usable rubber bag, store the bag or bags at a batch plant or at the job site itself, and, when the concrete is needed, empty the bag into a mixer, highway paver or ready-mix truck.

Rodeffer Industries, Inc., Pasadena, Calif., has developed a two-compartment bag for the purpose. The development may do for concrete handling what ready cake-mixes did for baking.

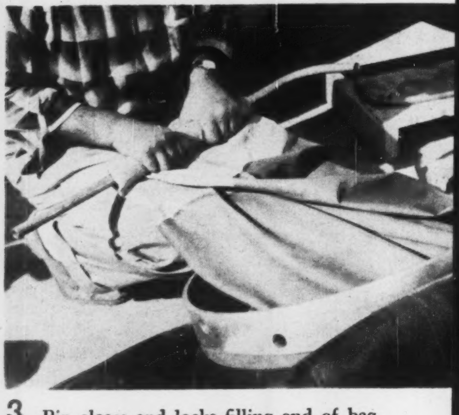
The present bag model is 6 ft high and holds 1½ cu yd in two compartments. The outer compartment contains coarse aggregate, fine aggregate and water. The cement rests in an inner compartment, which is completely sealed off from the water. The bag can be used 800 to 1,000 times before replacement is necessary.

Here are the advantages Rodeffer claims for its invention:

How it works



1. Collapsible bag is ready for filling.



3. Pin closes and locks filling end of bag.

No Water Just Stir

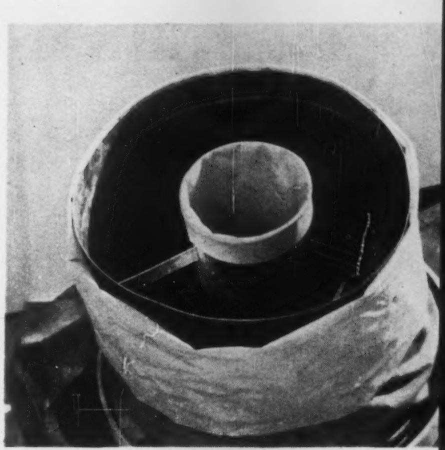
- One assembly line at a quarry can replace individual batch plants at other locations and make many, if not all, ready-mix concrete trucks unnecessary.
- If used on a mass production basis, the bags will reduce the cost of batching a cubic yard of concrete by as much as 75%.
- Mass production at a central location would improve quality control and reduce plant investment.
- Operating difficulties associated with varying demand would be eliminated by stocking an inventory of bags and using them as needed on a straight line type of operation.

There's a lifting ring built into the bottom of the bag so it can be handled by any lifting device normally found in the field. The bag can be dropped to the ground from normal dumping heights without damage.

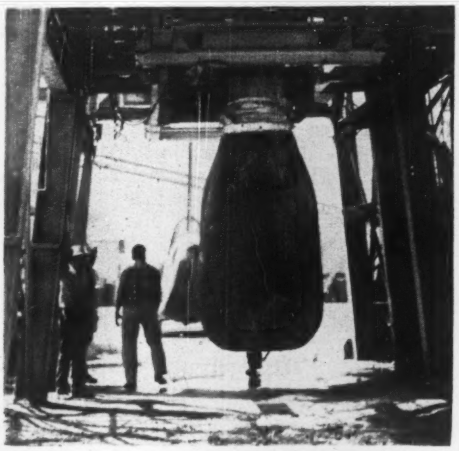
Filling the bag requires only minor adaptations to a conventional concrete batch plant, rock-processing plant or any other source of raw materials that has the necessary weighing devices.

Rodeffer loads the bags from a special platform at its batch plant, where containers are suspended under the discharge hopper. The platform, which rides on rails and is chain driven, has an adapter to match the chambers in the bag. Empty bags are hoisted by winch to the platform, where three lifting bars are connected to holes in the collar of the bag. The platform moves below the hopper, which comes down to meet it; cement, aggregates and water discharge into the bag. The platform then moves to another location, where the bag is picked up by a five-ton fork lift truck.

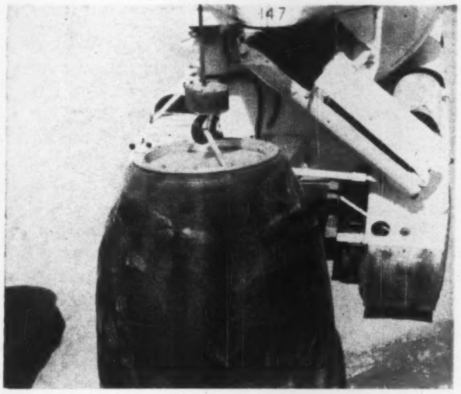
Rodeffer Industries, which is one of southern California's largest producers of sand, gravel and ready-mix concrete, has used the bag on a variety of test jobs. It has patents pending on the bag, and is waiting out the application period before using them on a full-scale basis. The firm has equipped three of its 6½ cu yd truck mixers with special lifting attachments to handle the bags.



RUBBER BAG has two compartments. Inner compartment holds cement; outer holds aggregates and water.



2. Bag fills from hopper of batch plant.



4. To lift, hook goes through bar at other end.

5. Workman pulls pin to empty bag. Any standard mixer can be used.

Around the World . . .

- **Squeeze-play**—Raymond International, Inc., of New York City reports that net earnings of $1.6 million were 68% below 1959. That's despite a 21% rise in gross income, which tallied $112.5 million. The drop in net is largely attributed to cost overruns on Raymond's share of joint-venture contracts for missile bases.

- **Thinking ahead**—Delaware's State Highway Department reported recently that the state will need $280 million to bring its highways up to best standards within the next 20 years. Two-thirds of this amount is expected to come from the federal government.

- **First for the Mall**—Rohm & Haas Co. is scheduled to build the first office building in Philadelphia's Independence Mall—urban renewal project (ENR Oct. 13, 1959, p. 49). George M. Ewing Co. of Philadelphia is architect on the $6-million project.

- **Repair bill and a half**—The Jersey City Sewerage Authority has asked the city for a $3-million loan to repair two four-year-old treatment plants. The rundown condition of the plants was revealed last week in a survey made by Mayo, Lynch & Associates, Hoboken. The study was ordered by the authority last fall when the Interstate Sanitation Commission reported that both plants were malfunctioning and causing pollution of the Hudson River and Newark Bay.

- **One for the road**—National Highway Week, May 21 to 27, will be launched this year by the Better Highways Information Foundation to increase public understanding of the U. S. highway program. The foundation will explain the program through newspapers, magazines, radio, television, government bodies and civic and social organizations.

- **Mum's the word** — The Federal Aviation Agency has signed a contract for construction and operation of a $4-million, 200-room hotel at the Dulles International Airport outside Washington, D. C. Airway Hotel of Washington, Inc., located in Miami, Fla., will build a reinforced concrete four-story hotel with rooms isolated from the structure and exterior walls to insure peace and quiet for guests.

- **Alabamans hail Jackson Lock**—The Corps of Engineers' $21.6-million Jackson Lock and Dam will be dedicated April 7 at ceremonies sponsored by the Warrior-Tombigbee Development Association. The navigation installation eliminates three outmoded locks and dams and creates a dependable channel extending 100 miles up the Tombigbee River to Demopolis, Ala.

- **No building commission**—Gov. Donald Nutter vetoed a bill passed by the Montana legislature setting up a three-member commission to control building by the state. The governor said the bill did not include an engineer on the commission, provided no money for an architect and insufficient funds for operation.

- **Paris tells Tel-Aviv**—Regie Autonome des Transports Parisiens will make a survey of the possibilities of subway construction in Tel Aviv. Officials there think a subway is the only solution to problems brought on by rapid expansion.

- **Going to the ponies**—A bill before the West Virginia legislature proposed to finance the purchase of eight stone crushers for use on road projects by boosting the state tax on pari-mutuel horse betting by 1%. The extra revenue would be earmarked for the purpose.

- **Industrial park**—Work will start this spring on a $15-million industrial and commercial park near Port Jefferson, N. Y. Buildings on the 118-acre site will total 1.5 million sq ft. Emil M. Keen and Irving Kramer, Long Island builders, are the developers.

- **Road count**—There are 3.5 million miles of roads and streets under jurisdiction of all levels of government in the U. S., according to a Bureau of Public Roads report. Twenty-nine percent are unsurfaced.

- **Cancelled insurance**—Ten stainless steel sheets, set aside 31 years ago as emergency replacements for the stainless facade atop the 77-story Chrysler Building in New York City were no sooner discovered in a Republic Steel Corp. warehouse than they were scrapped. The latest in a series of periodic inspections occurred late last year. It showed the smoke-stained facade and the soldered joints in excellent condition.

Crane Crash Report

Crane that fell into ICBM silo left parked in gear

The 20-ton truck crane that killed six construction workers and injured 14 others when it crashed to the bottom of an Atlas ICBM silo near Roswell, N. M., last month had been parked at the edge of the silo in reverse low gear, according to a Corps of Engineers and Air Force report.

When a driver in the truck cab started the engine to move to another location, the crane backed over the edge of the silo and plunged 172 ft to the bottom, where its gas tanks exploded (ENR Feb. 23, p. 23).

According to the report, the driver jumped from his cab when the crane began to back towards the lip of the 52-ft-dia silo. Two ironworkers tried to put blocks in front of the wheels, but the truck pushed the blocks aside, moving relentlessly towards the hole. One of the ironworkers leaped to the side of the cab to try to stop the crane. But as the rear wheels of the crane approached the rim of the silo, the ironworker and the crane operator leaped to safety.

The silo is one of 12 launching silos under construction near Walker Air Force Base. The silo damage isn't expected to delay completion of the missile base greatly.

A four-company joint venture has a $22-million contract for the project—Macco Corp., Paramount, Calif.; Raymond International Inc., New York City; Henry J. Kaiser Corp., Oakland, Calif., and Puget Sound Bridge and Drydock Corp., Seattle. Macco is the sponsoring company.

Parking Garages Aggravate Traffic, Say City Planners

New York City's City Planning Commission voted unanimously last week to cancel plans for three city-owned parking garages.

The city's Department of Traffic originated the plan for a network of 17 city-owned garages with a total capacity of 10,600 automobiles. One has already been completed.

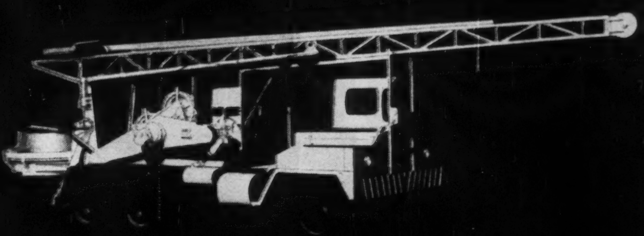
The Traffic Department claimed that these parking facilities would attract customers to mid-Manhattan shops, theaters and restaurants.

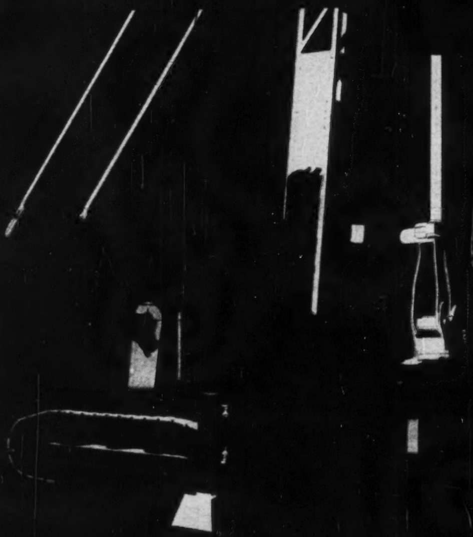
But the Planning Commission said: "New parking garages in the midtown core area would attract many commuters, business travelers and shoppers who presently use mass transit or less convenient parking facilities. This means, in effect, not more business travelers, not more shoppers, but more automobiles."

CALWELD...

TRUCK MOUNTED

[illegible]





CRANE MOUNTED

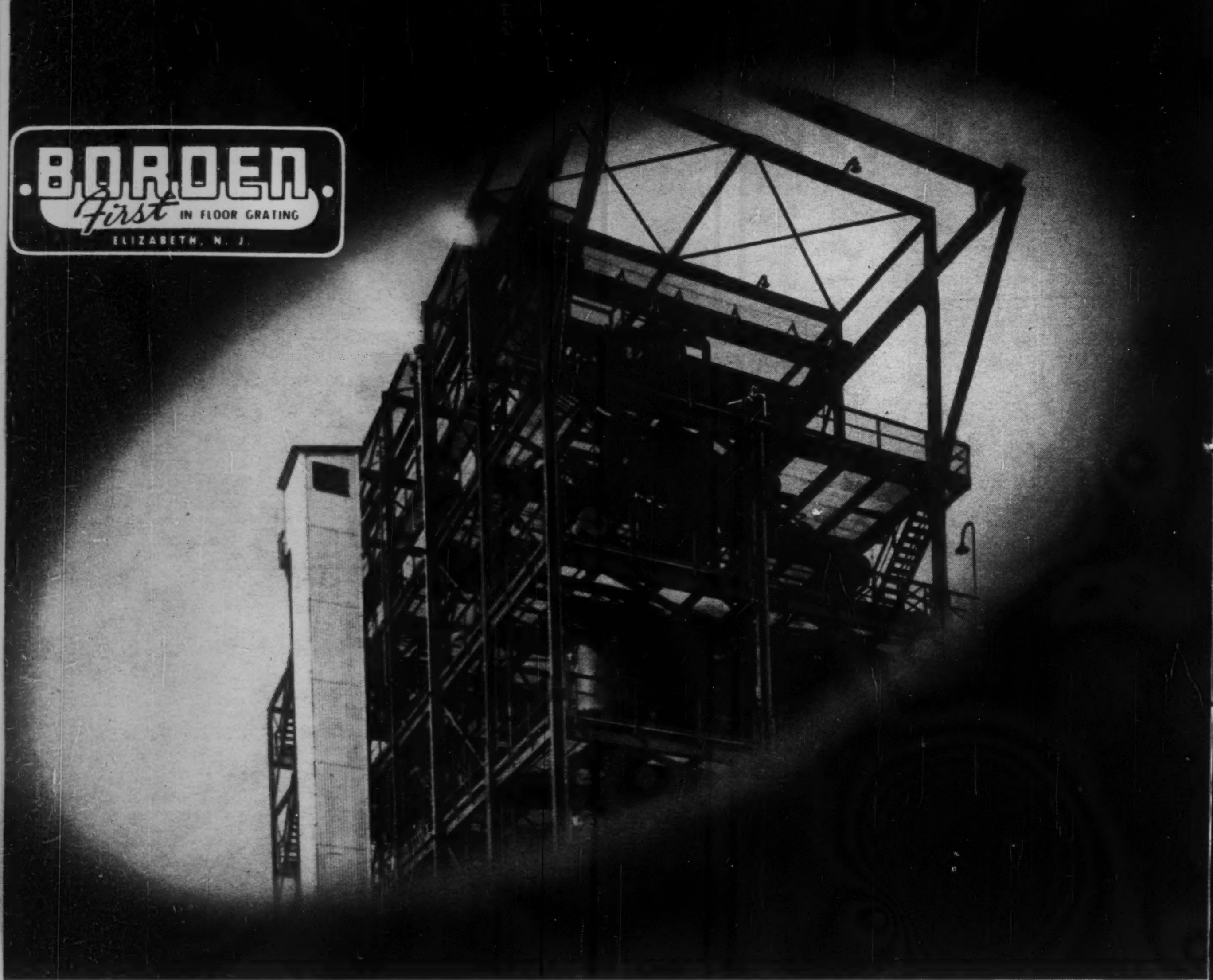
Now your crane can do extra duty as a big-capacity earth drill ... [illegible] Calweld Drills mount on any [illegible] mounted crane in less than half an hour. [illegible] operated by one crane man [illegible] clean, straight holes [illegible] series 1[illegible] A complete line of Calweld bucket drills [illegible] for all types of [illegible]

TRACTOR MOUNTED

[illegible]

CALWELD

CALWELD DRILLS



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HERE'S HOW BORDEN FLOOR GRATING CUTS COSTLY FIELD CORRECTIONS

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1. A shop drawing of the job is submitted to the customer for approval, when necessary. This plan shows the size and shape of the grating area—how grating clears all obstructions.
2. Each finished panel is carefully checked for accuracy of dimensions.
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4. The entire platform is laid out on our shop floor. Over-all dimensions and obstruction openings are checked against shop drawings.
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CIRCLE 50 ON READER SERVICE CARD

Engineering News-Record Construction Cost Index

20-CITIES AVERAGE as computed on BASE: 1913 = 100

As converted to OTHER BASES

Year:	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
	93.90	87.40	90.55	95.10	100.55	97.20	90.92	96.33	93.43	90.70	100.00
Year:	**1914**	**1915**	**1916**	**1917**	**1918**	**1919**	**1920**	**1921**	**1922**	**1923**	**1924**
	88.56	92.58	129.58	181.24	189.20	198.42	251.28	201.82	174.45	214.12	215.36

1913 BASE values ÷ these conversion factors:

2.0803 2.3551 2.4196 4.7702

Yr-Mo	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average	Year	1926 =100	1939 =100	1940 =100	1949 =100
1925	210.40	209.70	210.20	209.55	207.20	204.60	204.60	204.60	202.10	205.35	205.95	205.95	**206.68**	1925	99	88	85	43
1926	207.15	206.55	207.65	207.05	207.30	204.80	207.80	208.30	208.30	209.80	210.80	210.80	**208.03**	1926	100	88	86	44
1927	211.50	210.15	208.80	209.00	206.80	205.55	203.68	205.50	203.60	204.40	201.98	203.90	**206.24**	1927	99	88	85	43
1928	203.90	204.65	204.65	206.40	207.00	206.15	206.65	207.29	207.29	207.71	209.46	210.16	**206.78**	1928	99	88	85	43
1929	209.40	210.40	207.78	203.40	205.15	205.65	204.77	205.91	207.57	206.32	208.46	209.46	**207.02**	1929	100	88	86	43
1930	208.96	206.46	206.80	207.12	205.86	203.36	200.95	200.95	199.58	198.72	198.54	196.86	**202.85**	1930	98	86	84	43
1931	194.48	196.61	194.51	191.63	189.33	187.23	174.37	171.38	171.40	169.78	169.28	166.23	**181.35**	1931	87	77	75	38
1932	162.48	161.82	157.24	153.12	152.78	152.20	153.36	156.80	157.96	159.16	158.20	158.46	**156.97**	1932	75	67	65	33
1933	158.44	159.30	158.44	160.16	164.39	163.41	165.50	167.00	175.48	187.74	190.14	192.14	**170.18**	1933	82	72	70	36
1934	191.26	194.06	194.06	195.86	199.61	199.61	199.65	198.40	200.58	200.86	201.36	201.86	**198.10**	1934	95	84	82	42
1935	198.22	195.07	194.41	194.65	193.96	196.73	197.43	197.45	197.30	197.50	197.35	197.20	**196.44**	1935	94	83	81	41
1936	201.23	201.33	201.63	202.80	204.05	205.08	204.80	208.48	208.88	211.53	211.50	215.70	**206.42**	1936	99	88	85	43
1937	221.20	222.05	224.75	231.35	233.45	237.25	239.90	240.65	241.62	241.90	241.40	241.05	**234.71**	1937	113	100	97	43
1938	239.62	238.99	238.79	237.95	236.80	236.86	232.29	232.39	232.70	234.30	234.40	234.89	**235.83**	1938	113	100	97	49
1939	234.72	234.31	234.43	234.86	234.69	235.02	234.94	234.90	234.97	236.86	238.20	238.17	**235.51**	1939	113	100	97	49
1940	238.34	238.32	238.29	238.26	238.86	241.59	242.15	242.18	244.13	245.02	247.24	249.12	**241.96**	1940	116	103	100	51
1941	249.69	250.50	250.71	252.40	255.55	256.79	258.18	260.41	263.12	264.46	266.13	266.16	**257.84**	1941	124	109	107	54
1942	267.63	269.41	269.71	271.78	272.30	274.19	277.65	281.61	281.61	282.44	283.64	283.69	**276.30**	1942	133	117	114	58
1943	283.45	283.48	285.24	288.80	289.87	289.94	289.92	291.38	294.09	294.31	294.41	294.51	**289.95**	1943	139	123	120	61
1944	294.57	295.05	295.34	297.70	298.00	298.72	299.94	300.42	300.46	301.06	301.09	302.30	**298.72**	1944	144	127	123	63
1945	302.50	303.70	304.50	306.43	307.43	308.99	308.99	309.08	309.28	309.28	309.28	313.48	**307.75**	1945	148	131	127	65
1946	316.32	319.52	323.83	334.59	339.69	348.72	354.70	361.37	360.19	360.94	362.47	369.30	**345.98**	1946	166	147	143	73
1947	386.97	393.73	395.45	399.56	399.98	406.63	413.75	422.85	426.38	434.58	436.91	441.13	**413.24**	1947	199	175	171	87
1948	441.65	442.67	443.60	443.64	444.86	455.80	464.83	477.11	478.40	480.21	478.25	477.66	**460.72**	1948	222	196	190	97
1949	477.41	475.37	474.80	474.34	472.10	473.78	477.46	478.28	479.78	480.54	480.02	480.32	**477.02**	1949	229	203	197	100
1950	484.74	484.85	488.35	491.94	496.55	506.88	512.67	521.36	530.97	536.23	530.01	530.83	**509.62**	1950	245	216	211	107
1951	532.53	538.60	539.83	540.57	543.53	543.37	542.94	543.46	543.57	547.11	547.65	548.27	**542.65**	1951	261	230	224	114
1952	548.43	549.86	551.20	554.72	557.71	562.29	571.25	584.29	586.68	589.03	589.21	588.09	**569.40**	1952	274	242	235	119
1953	587.87	587.79	588.04	590.07	589.57	593.71	604.64	612.55	610.89	611.64	611.80	611.30	**599.99**	1953	288	255	248	126
1954	614.06	614.73	614.01	615.38	618.71	621.91	628.26	641.68	640.18	641.49	642.42	642.71	**627.96**	1954	302	267	260	132
1955	643.72	645.24	645.70	647.49	653.26	655.96	660.09	672.24	672.74	673.89	673.20	673.13	**659.72**	1955	317	280	273	138
1956	676.36	680.21	680.20	683.28	688.43	692.13	694.75	696.31	704.91	703.88	704.13	703.82	**692.37**	1956	333	294	286	145
1957	707.90	710.06	708.64	709.30	715.70	721.36	724.15	738.63	737.78	737.14	737.43	738.08	**723.85**	1957	347	307	299	152
1958	743.44	743.77	744.41	745.78	751.57	757.31	762.52	764.44	773.47	775.30	774.12	773.81	**759.16**	1958	365	322	314	159
1959	778.28	778.75	781.35	784.41	790.37	794.36	805.89	810.35	811.76	810.60	808.98	807.85	**796.91**	1959	383	338	329	167
1960	811.84	812.73	813.26	814.78	822.58	826.64	829.33	830.18	830.92	829.58	830.09	830.61	**823.55**	1960	396	350	340	173
1961	834.32	834.27	......	......	......	......	......	......	......	......	......	......	......	1961	...	...	...	...

TO CONVERT EN-R COST INDEXES to new bases: Divide the 1913 series values by 1/100th of the 1913 value for the new base year.

Engineering News-Record Building Cost Index

20-CITIES AVERAGE as computed on BASE: 1913 = 100

As converted to OTHER BASES

Year:	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
	....	....	....	....	....	....	....	....	....	....	100.00
Year:	**1914**	**1915**	**1916**	**1917**	**1918**	**1919**	**1920**	**1921**	**1922**	**1923**	**1924**
	91.91	95.28	130.88	166.79	159.10	158.77	207.23	166.05	154.85	185.98	185.78

1913 BASE values ÷ these conversion factors:

1.8499 1.9744 2.0281 3.5179

Yr-Mo	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Average	Year	1926 =100	1939 =100	1940 =100	1949 =100
1925	182.70	184.50	184.50	184.65	182.80	183.00	182.71	183.00	180.50	181.75	182.35	183.05	**182.93**	1925	99	93	90	52
1926	183.94	183.65	184.25	184.05	183.55	181.80	184.30	185.10	185.10	187.95	187.95	187.95	**184.96**	1926	100	94	91	53
1927	187.80	189.15	187.30	186.00	185.40	185.75	183.88	186.50	184.60	186.60	184.98	185.10	**186.09**	1927	101	94	92	53
1928	185.90	187.15	187.15	188.80	190.10	187.55	187.55	187.55	187.55	187.55	188.80	190.00	**187.97**	1928	102	95	93	53
1929	190.00	190.00	190.00	190.00	191.25	191.95	191.95	192.75	191.55	190.30	190.30	190.30	**190.86**	1929	103	97	94	54
1930	190.30	188.50	189.20	188.80	187.90	185.40	183.25	183.65	182.40	181.80	181.80	181.80	**185.40**	1930	100	94	91	53
1931	180.70	181.95	180.19	177.55	174.55	169.65	164.05	160.10	159.50	158.10	157.40	154.15	**168.10**	1931	91	85	83	48
1932	150.60	147.20	145.88	135.68	136.38	137.58	139.48	139.40	139.60	140.00	139.50	140.00	**140.94**	1932	76	71	69	40
1933	140.82	141.70	140.80	141.50	143.85	143.20	144.30	145.90	154.50	157.05	159.00	160.70	**147.78**	1933	80	75	73	42
1934	160.15	161.30	161.70	163.15	168.15	168.15	169.15	168.40	170.10	170.20	170.20	170.20	**166.74**	1934	90	84	82	47
1935	166.50	165.75	164.10	164.40	163.30	164.85	165.25	166.20	166.05	167.30	167.30	167.15	**165.76**	1935	90	84	82	47
1936	168.25	168.43	169.68	170.00	170.35	170.18	170.85	173.93	174.33	175.33	175.50	179.30	**172.18**	1936	93	87	85	49
1937	185.45	186.55	187.65	194.95	197.15	199.20	199.80	200.65	200.62	201.00	200.30	200.45	**196.15**	1937	106	99	97	56
1938	198.62	198.99	199.29	198.21	197.86	198.22	194.39	194.49	194.80	195.48	195.58	196.07	**196.83**	1938	106	100	97	56
1939	196.24	196.23	196.46	196.45	196.60	196.41	196.78	196.54	196.61	198.50	201.24	201.21	**197.44**	1939	107	100	97	56
1940	201.52	201.50	201.47	201.44	201.17	201.65	201.68	201.71	203.13	204.02	206.24	208.19	**202.81**	1940	110	103	100	58
1941	207.94	208.42	207.88	208.60	209.24	209.41	210.22	212.45	214.58	215.92	216.54	216.37	**211.46**	1941	114	107	104	60
1942	217.12	218.44	218.88	219.55	220.14	221.18	223.45	225.39	225.46	225.90	226.58	226.63	**222.39**	1942	120	113	110	63
1943	226.87	226.90	226.66	227.50	227.64	227.71	227.89	228.49	231.20	231.29	231.39	231.49	**228.75**	1943	124	116	113	65
1944	231.55	232.03	232.32	234.50	234.80	235.33	235.55	236.09	236.00	236.00	236.10	236.51	**234.73**	1944	127	119	116	67
1945	236.51	237.71	237.85	238.46	238.46	239.37	239.64	239.94	240.07	240.35	240.55	240.82	**239.14**	1945	129	121	118	68
1946	242.23	243.94	245.41	254.37	258.06	265.28	267.25	272.29	272.37	273.01	273.99	279.97	**262.25**	1946	142	133	129	75
1947	294.62	301.56	303.28	305.21	304.64	307.42	308.90	317.75	322.58	327.29	329.22	333.06	**312.96**	1947	169	159	154	89
1948	333.58	335.49	334.22	334.56	333.93	339.26	342.42	355.45	356.70	357.07	355.86	355.55	**344.51**	1948	186	175	170	98
1949	354.98	352.94	352.54	351.42	348.92	349.28	349.46	350.85	351.98	353.02	352.91	353.21	**351.79**	1949	190	178	173	100
1950	356.23	356.48	359.98	362.78	364.27	373.39	377.66	383.12	392.18	397.42	390.21	391.44	**375.47**	1950	202	190	185	107
1951	392.99	398.21	399.32	400.06	401.10	400.84	400.34	400.15	400.26	403.43	404.50	405.79	**400.56**	1951	217	203	198	114
1952	405.76	406.19	407.42	407.94	410.30	412.50	414.46	422.36	424.40	424.77	426.04	424.92	**415.58**	1952	225	211	205	118
1953	425.04	425.24	424.89	426.39	426.23	426.21	435.15	436.86	435.98	435.98	435.95	435.45	**430.78**	1953	233	218	212	122
1954	436.42	437.09	436.71	437.48	438.24	439.67	444.05	455.54	454.28	455.54	456.34	456.77	**445.68**	1954	241	226	220	127
1955	457.91	459.43	459.63	460.62	462.55	464.82	467.52	478.03	479.15	479.99	479.30	478.70	**468.80**	1955	254	237	231	133
1956	480.48	483.08	483.14	485.56	487.36	488.70	489.23	491.22	500.10	499.54	500.48	500.17	**490.76**	1956	265	249	242	140
1957	501.96	502.59	501.37	501.37	503.01	504.17	506.62	516.90	516.12	516.78	516.81	516.27	**508.67**	1957	275	258	251	145
1958	516.79	515.78	516.09	516.61	518.62	521.09	524.29	525.62	535.02	536.53	534.96	534.79	**524.68**	1958	284	266	259	149
1959	536.23	537.25	540.32	542.93	544.44	548.35	551.74	554.31	555.88	555.40	554.19	552.87	**547.82**	1959	296	277	270	156
1960	554.40	555.43	555.16	555.98	559.57	561.02	562.63	562.17	562.79	561.45	561.11	561.50	**559.43**	1960	302	283	276	159
1961	562.91	562.93	......	......	......	......	......	......	......	......	......	......	......	....	...	...	...	...

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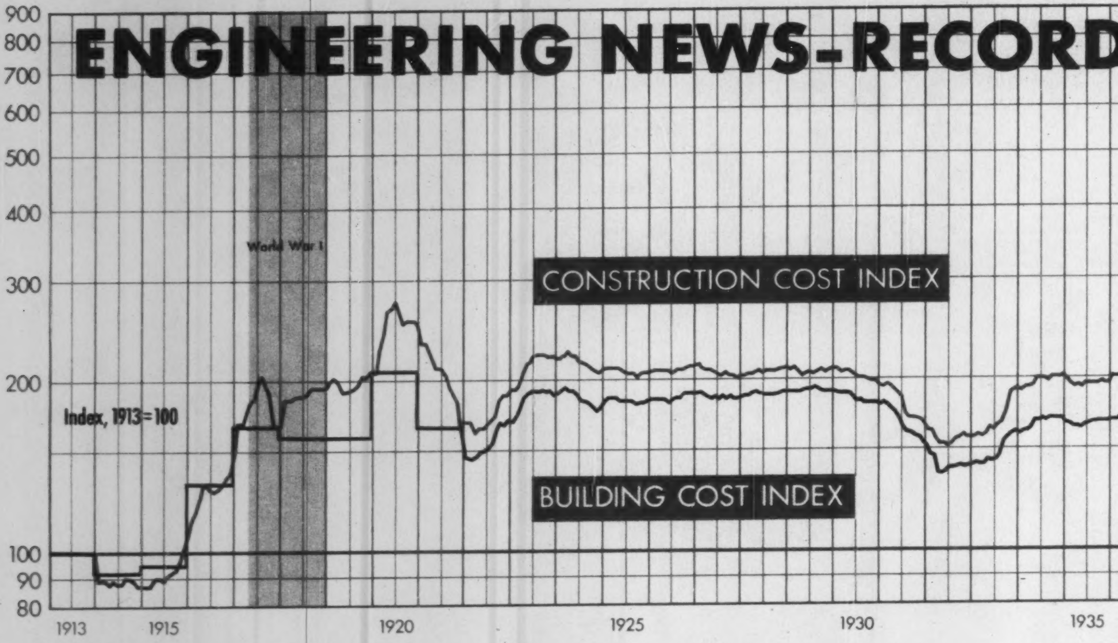
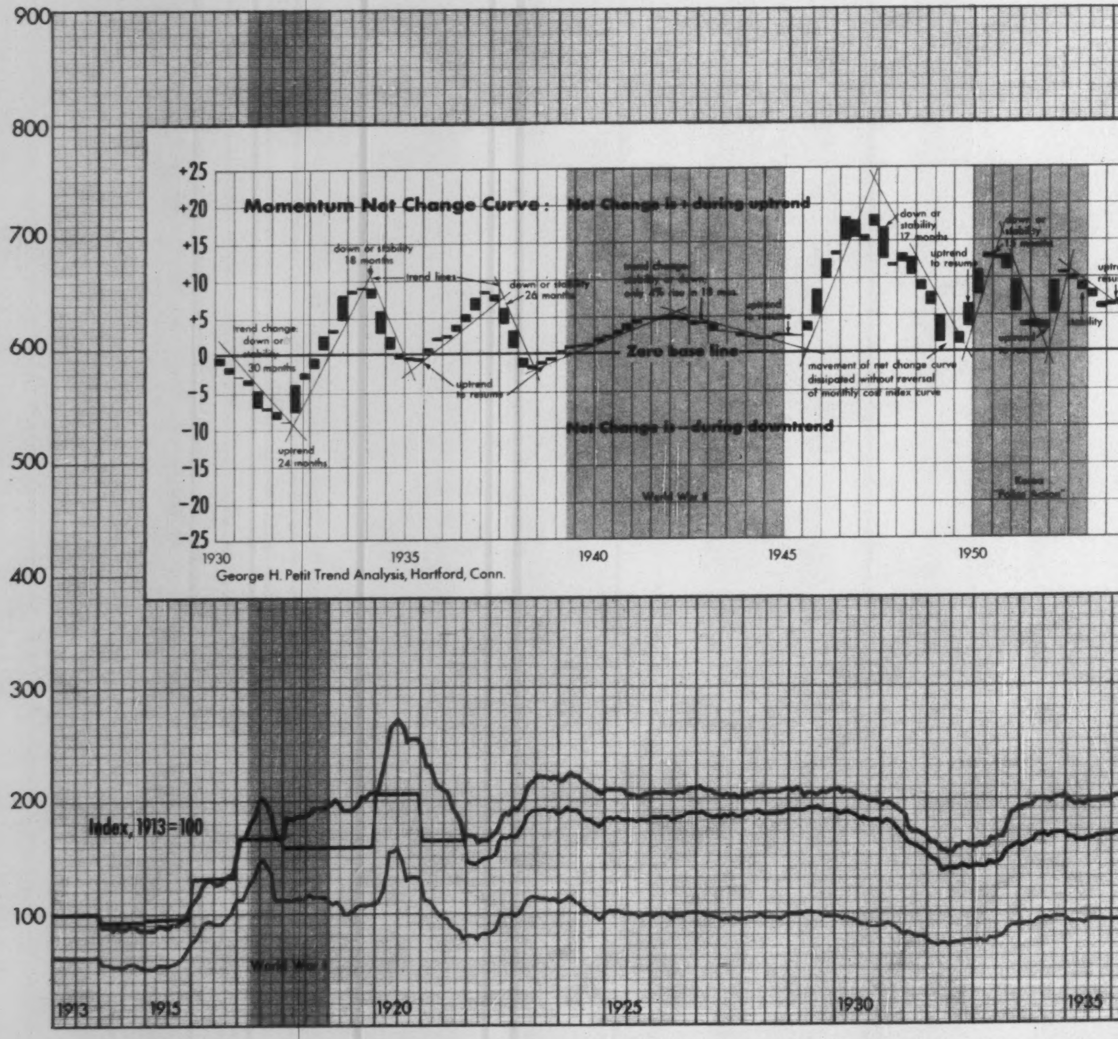
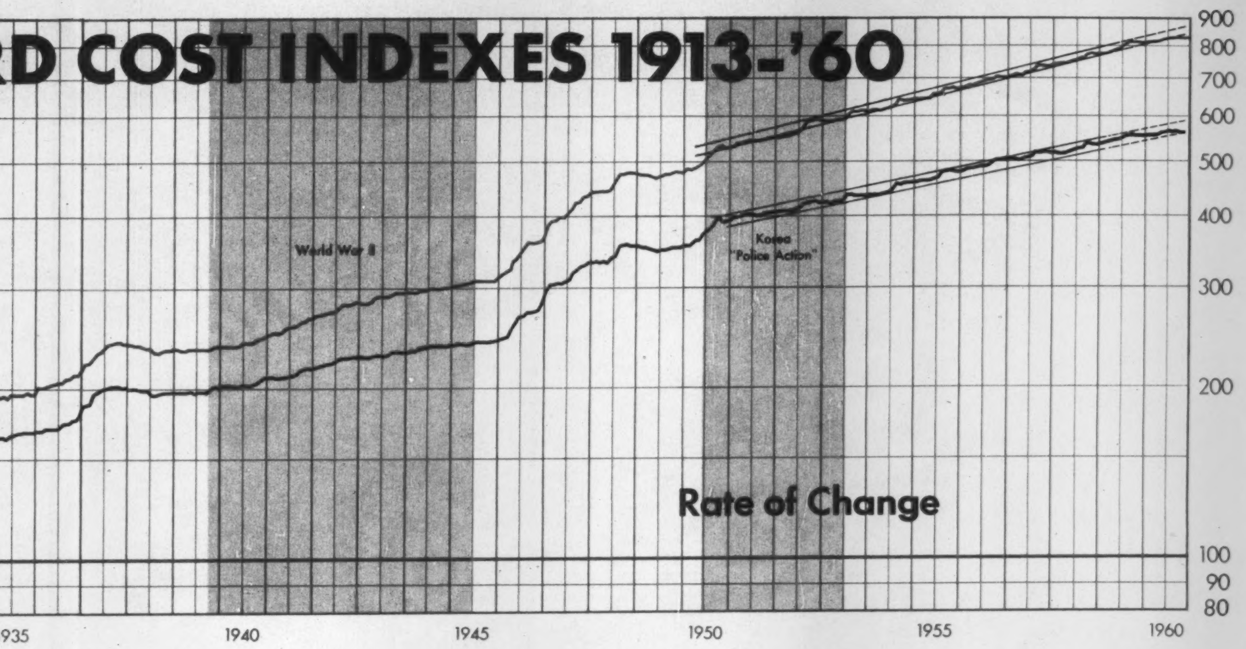
ENGINEERING NEWS-RECORD

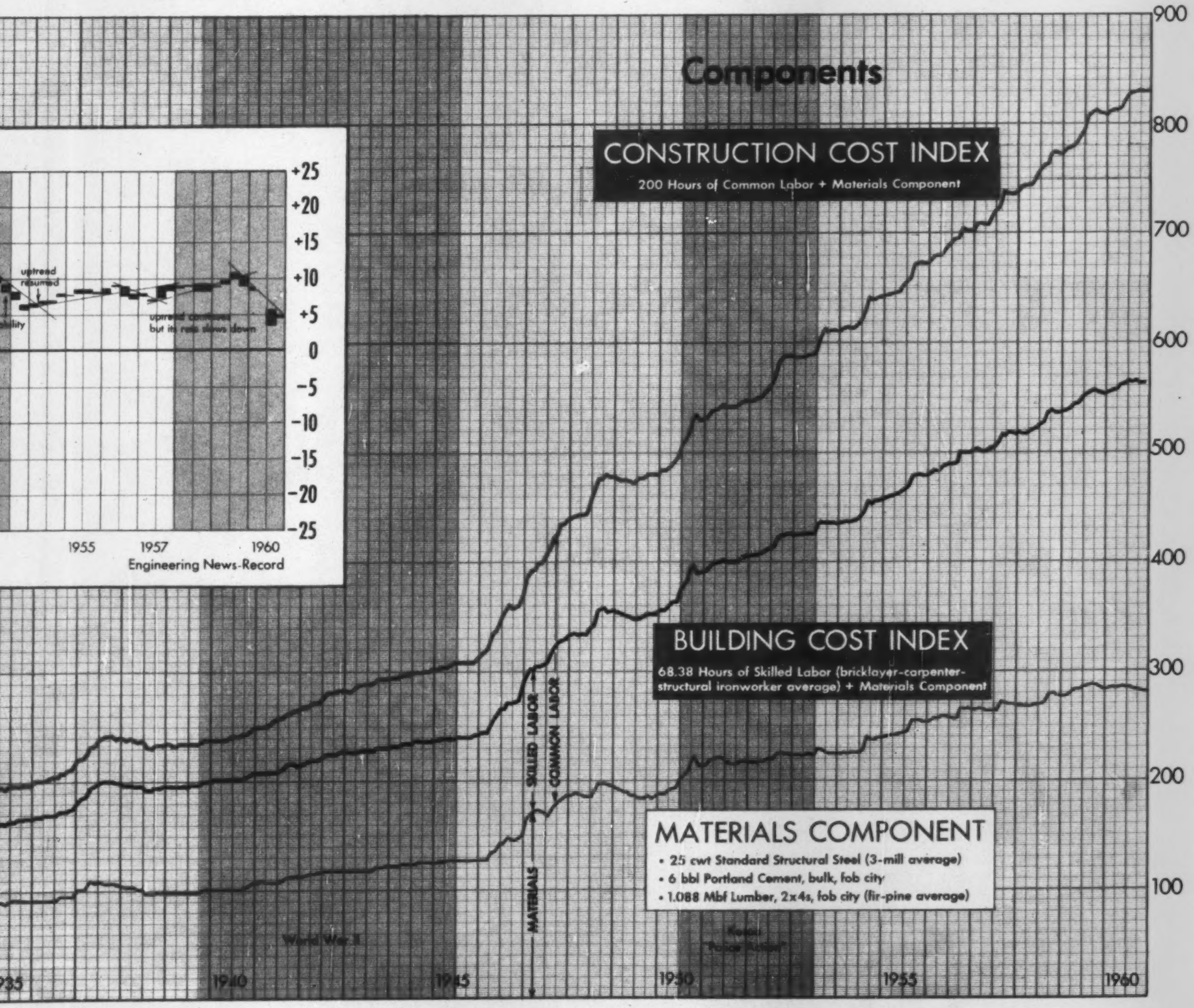




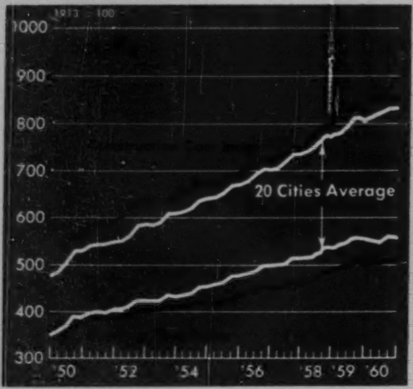
George H. Petit Trend Analysis, Hartford, Conn.

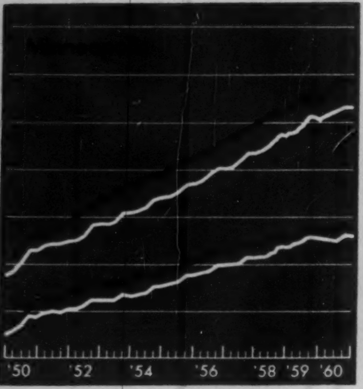
RD COST INDEXES 1913-'60

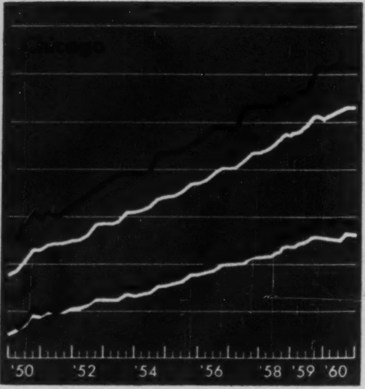


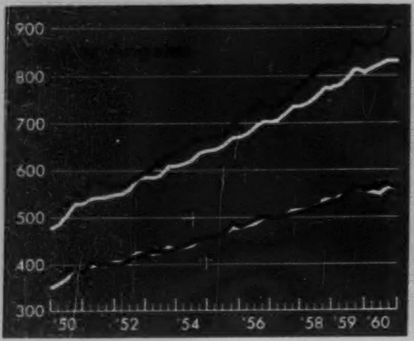


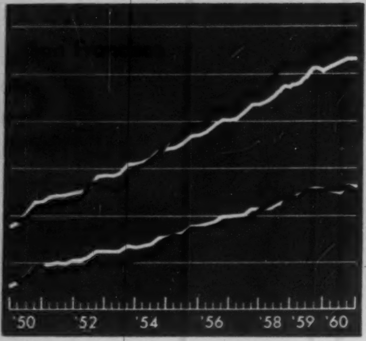
Engineering News-Record

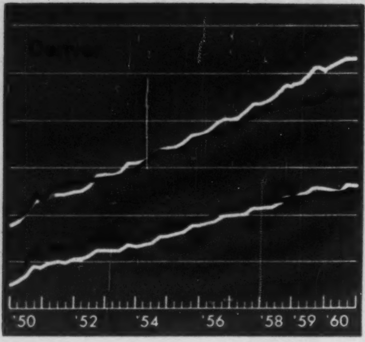






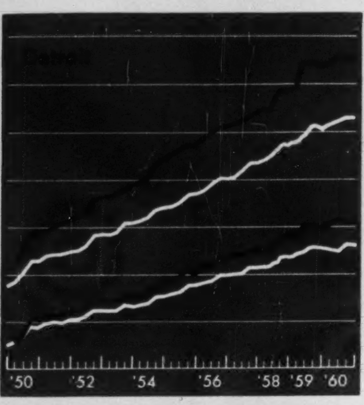


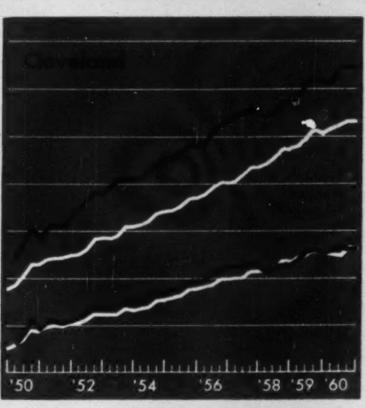


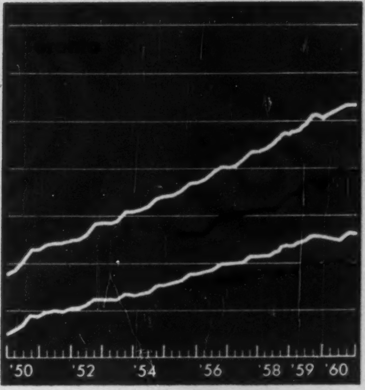


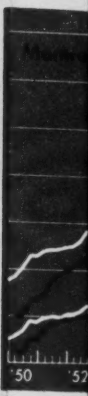
Engineering News-Record CONSTRUCTION AND BUILDIN

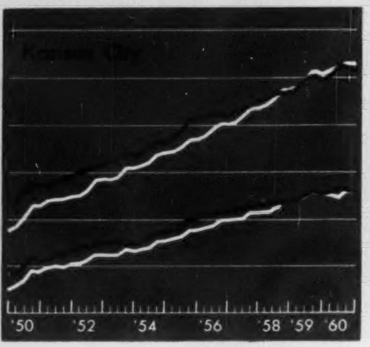
	FAR WEST						MISSISSIPPI TO THE ROCKIES										MIDDLE WES				
	LOS ANGELES		SAN FRANCISCO		SEATTLE		DALLAS		DENVER		KANSAS CITY		MINNE-APOLIS		ST. LOUIS		CHICAGO		CINCINNATI		CLE
Year–Month	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Cons
1948 Sept...	511	368	490	350	512	328	398	322	499	369	500	366	512	370	542	385	537	360	505	374	535
Dec...	495	356	484	347	512	328	398	322	496	365	500	367	510	368	542	391	530	353	505	374	523
1949 Mar...	482	343	478	341	530	328	398	322	482	351	484	352	504	361	527	386	527	350	490	358	520
June...	478	339	478	341	530	328	398	322	482	351	501	357	504	361	508	375	526	349	487	358	514
Sept...	489	336	483	341	530	340	394	316	470	359	511	357	512	361	524	379	541	352	496	362	525
Dec...	494	340	483	345	530	341	397	318	470	359	511	357	512	363	522	377	542	353	496	362	530
1950 Mar...	511	360	486	352	534	344	422	322	491	378	528	374	516	377	529	384	550	361	502	360	537
Jun...	529	380	495	361	548	358	423	323	506	395	551	390	538	389	552	396	584	381	510	368	578
Sept...	552	392	513	383	564	374	423	323	541	423	571	410	555	406	579	431	607	404	568	406	605
Dec...	537	377	519	389	563	374	438	338	528	400	570	406	562	413	569	421	593	391	553	392	587
1951 Mar...	580	403	518	375	586	384	437	362	552	426	570	406	557	408	585	432	603	401	559	400	607
Jun...	572	395	533	380	586	384	437	362	558	432	575	411	587	421	597	436	598	395	556	398	606
Sept...	558	381	525	377	593	389	437	371	564	423	586	417	587	423	584	422	620	403	543	395	603
Dec...	569	398	527	379	592	383	437	371	564	425	586	417	592	438	587	427	624	413	548	401	626
1952 Mar...	565	394	532	383	606	389	437	371	571	431	586	431	593	438	587	429	626	415	547	400	625
Jun...	574	407	565	386	620	389	437	371	572	433	588	434	593	438	608	444	626	416	553	406	685
Sept...	610	415	573	401	635	400	455	382	577	452	623	446	628	450	629	448	661	432	612	423	684
Dec...	610	415	559	390	635	400	455	382	612	462	623	446	628	454	628	447	661	433	609	420	682
1953 Mar...	610	420	557	391	635	400	455	382	602	452	623	446	628	454	627	446	661	433	609	420	682
Jun...	612	421	556	390	636	401	463	387	582	434	623	452	655	459	648	446	690	443	613	424	706
Sept...	627	420	587	397	636	402	470	397	604	449	630	442	861	468	653	457	691	443	633	435	709
Dec...	626	419	600	400	643	402	482	405	595	441	630	442	661	468	654	455	690	443	631	434	708
1954 Mar...	634	428	602	402	664	412	470	393	595	441	635	446	661	468	655	455	692	445	630	435	712
Jun...	640	433	617	407	665	413	465	390	597	443	645	450	681	473	669	457	693	449	630	434	731
Sept...	665	448	631	423	682	419	487	405	633	468	661	466	697	491	684	473	734	467	641	444	738
Dec...	667	452	649	443	676	414	484	402	632	467	663	466	697	492	687	477	734	468	642	445	751
1955 Mar...	667	453	658	447	676	414	484	402	635	470	665	468	697	492	693	482	736	469	645	450	759
Jun...	672	457	676	445	681	418	488	406	637	474	686	479	711	493	720	495	741	477	664	456	762
Sept...	705	483	690	469	693	436	507	422	656	485	703	496	720	502	728	503	752	488	673	467	785
Dec...	708	479	684	463	685	428	510	426	653	483	703	496	720	502	727	502	762	486	671	466	785
1956 Mar...	714	485	693	471	715	439	512	428	655	487	707	499	721	503	757	523	769	493	674	469	785
Jun...	733	491	726	478	720	444	509	424	670	488	711	498	747	515	756	522	788	500	680	475	809
Sept...	736	497	727	483	724	452	534	446	680	503	722	509	757	526	761	527	792	507	717	493	826
Dec...	731	494	722	484	722	450	534	449	696	519	715	503	757	526	759	525	790	506	715	491	819
1957 Mar...	731	494	720	485	746	452	525	439	697	523	715	505	758	527	760	529	789	504	711	486	820
Jun...	731	496	758	486	749	456	525	439	702	510	735	503	781	530	789	538	831	511	713	489	856
Sept...	778	508	763	497	756	467	547	451	710	522	742	516	788	537	796	546	838	530	751	507	861
Dec...	778	513	761	506	747	458	547	451	710	522	742	516	788	537	796	546	836	528	748	504	859
1958 Mar...	773	507	758	503	785	466	547	451	725	523	742	517	803	537	814	552	835	527	745	501	847
Jun...	814	514	798	507	789	470	553	459	725	525	762	527	818	548	840	558	838	535	746	502	850
Sept...	822	527	820	533	799	484	573	469	731	530	768	533	825	554	849	567	857	560	780	519	874
Dec...	824	530	812	533	799	484	573	469	731	532	768	533	824	553	844	563	859	562	777	515	880
1959 Mar...	828	536	817	538	830	493	573	472	731	532	773	538	839	554	854	576	866	569	785	525	893
Jun...	839	552	824	550	836	499	573	474	742	537	793	548	855	564	891	590	875	578	790	529	919
Sept...	877	560	858	551	839	508	604	490	742	540	803	558	860	569	880	579	923	586	818	540	925
Dec...	868	554	850	549	831	500	604	490	747	545	798	553	859	569	874	573	918	581	814	539	921
1960 Mar...	870	556	851	553	859	504	604	491	758	542	798	553	860	570	880	579	919	582	815	540	920
Jun...	870	566	885	554	857	504	629	519	752	545	823	562	890	573	900	583	919	594	845	551	944
Sept...	908	569	883	560	855	506	639	524	756	551	818	559	890	581	895	579	917	592	844	549	943
Dec...	901	561	876	553	853	504	640	525	756	552	813	553	885	576	901	576	911	586	839	545	944

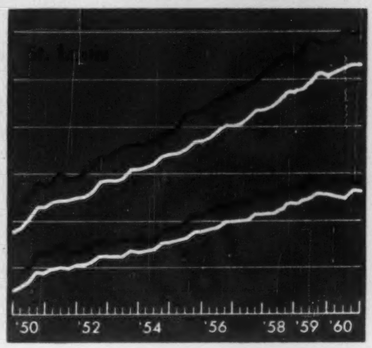


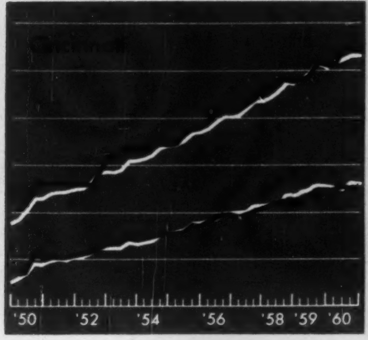


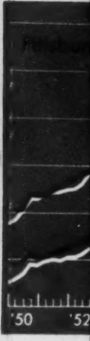






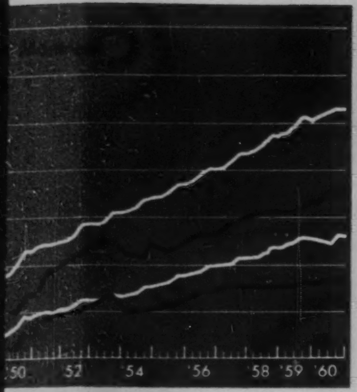


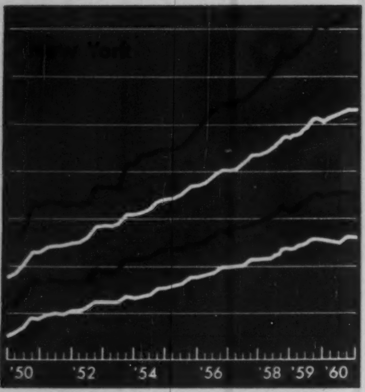


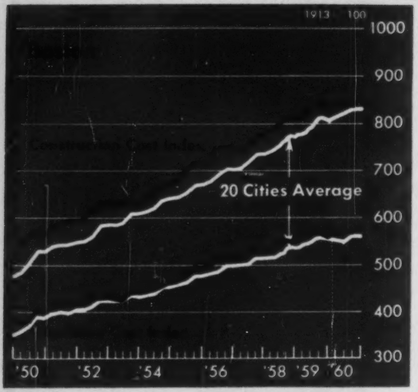


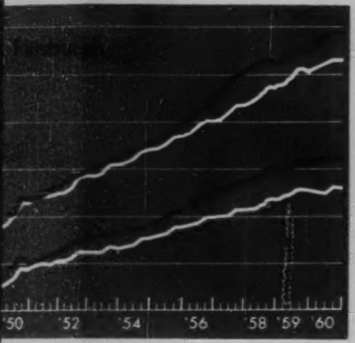
ING COST INDEXES in 22 CITIES, 1913=100

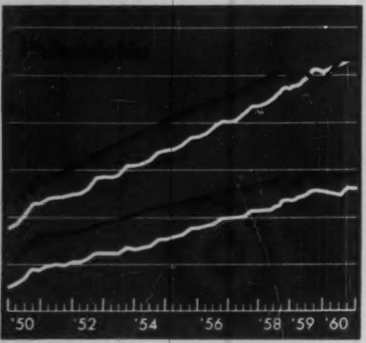
E WEST				SOUTH						MIDDLE ATLANTIC								NEW ENGLAND			U. S. 20-CITIES	
CLEVELAND		DETROIT		ATLANTA		BIRMINGHAM		NEW ORLEANS		PITTSBURGH		BALTIMORE		PHILADELPHIA		NEW YORK		BOSTON			AVERAG	
Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.	Year-Month	Constr.	Bld
535	352	511	358	325	302	378	320	350	302	470	376	462	375	470	394	549	403	513	363	1948 Sept...	478	357
523	339	500	347	345	308	379	321	354	310	502	384	462	387	467	391	541	395	508	357	Dec...	478	35
520	337	501	348	345	308	379	326	379	325	502	384	462	387	462	386	537	400	507	357	1949 Mar...	475	35
514	332	489	336	345	308	389	329	379	325	492	375	425	349	492	394	534	398	526	362	June...	474	34
525	342	514	351	345	309	389	330	379	325	492	375	424	354	517	394	533	397	525	361	Sept...	480	352
530	349	515	351	345	313	377	319	379	325	492	377	424	351	515	392	539	402	532	372	Dec...	480	353
537	356	521	357	354	316	381	321	383	329	497	382	427	354	518	397	546	410	536	375	1950 Mar...	488	36
578	379	555	376	354	316	381	321	402	340	499	387	462	375	541	415	575	439	556	379	Jun....	507	37
605	406	583	404	394	339	388	328	408	346	532	401	479	391	556	430	632	464	570	396	Sept...	531	39
587	388	592	400	390	339	413	345	438	376	529	397	474	387	575	449	622	459	563	392	Dec...	531	39
607	402	592	402	395	339	416	351	441	379	531	400	486	398	575	449	630	466	576	404	1951 Mar...	540	39
606	402	602	411	395	339	416	351	439	377	531	400	488	403	575	449	627	463	586	407	Jun...	543	40
603	399	601	410	395	339	416	351	434	379	551	405	482	398	582	456	621	457	590	412	Sept...	544	40
626	403	601	416	395	351	416	353	435	379	557	416	513	413	582	461	626	462	588	410	Dec...	548	40
625	403	621	419	395	351	417	355	435	379	557	416	510	410	601	462	623	460	590	411	1952 Mar...	551	407
685	419	625	424	395	353	417	358	437	381	577	416	511	414	616	472	629	465	614	422	Jun....	562	413
684	431	656	439	397	364	450	372	466	397	607	427	530	420	636	477	667	487	630	426	Sept...	587	424
682	428	663	438	402	371	450	372	466	397	607	439	526	416	636	480	665	484	629	425	Dec...	588	425
682	430	663	438	424	376	450	372	476	398	607	439	524	414	636	480	665	484	626	422	1953 Mar...	588	425
706	435	663	441	438	376	447	372	486	407	608	440	525	415	635	479	664	483	623	419	Jun...	594	426
709	439	687	450	460	394	469	390	506	419	640	460	551	427	666	494	713	505	626	433	Sept...	611	436
708	438	682	446	460	394	465	386	502	416	640	460	553	428	666	494	713	507	624	433	Dec...	611	435
712	442	685	449	458	392	465	386	506	419	645	463	549	424	666	494	732	509	627	436	1954 Mar...	614	437
731	451	700	452	458	392	465	386	516	422	645	463	548	423	681	503	732	516	659	438	Jun...	622	440
738	458	729	467	474	400	488	409	528	435	654	475	572	448	691	516	742	526	669	448	Sept...	640	454
751	464	729	466	474	400	507	420	523	432	654	475	578	455	691	516	745	528	671	453	Dec...	643	457
759	472	743	481	474	400	511	423	522	431	657	478	575	450	696	521	747	531	675	458	1955 Mar...	646	460
762	477	763	490	472	399	511	423	535	439	669	489	574	452	711	523	750	533	696	471	Jun...	656	465
785	489	776	503	492	417	519	434	545	449	690	498	595	472	721	533	794	548	709	488	Sept...	673	479
785	489	772	498	495	419	534	442	545	449	695	506	592	472	721	535	791	545	709	487	Dec...	673	479
785	489	778	505	502	424	546	443	547	451	688	500	591	472	722	536	816	553	712	490	1956 Mar...	680	483
809	508	800	514	502	424	549	447	564	457	688	500	595	491	737	538	819	556	744	503	Jun...	692	489
826	515	810	528	522	441	557	456	567	462	727	529	601	497	747	548	847	573	746	508	Sept...	705	500
819	508	808	527	522	441	553	455	564	464	727	533	602	498	747	549	842	569	747	509	Dec...	704	500
820	509	809	528	523	442	556	457	563	463	762	541	642	499	749	556	852	578	744	507	1957 Mar...	709	501
856	522	823	535	523	442	556	457	572	467	762	541	643	503	780	560	852	578	746	518	Jun...	721	504
861	527	832	545	550	458	563	468	581	477	791	566	670	518	776	562	890	590	773	531	Sept...	738	516
859	524	831	545	548	456	593	476	591	481	788	568	670	520	775	561	888	591	765	523	Dec...	738	516
847	512	852	545	558	456	593	477	588	478	804	569	672	523	775	561	910	578	764	522	1958 Mar...	744	516
850	515	852	545	558	461	593	480	591	477	819	573	701	527	795	569	912	578	793	528	Jun...	757	521
874	527	889	573	584	472	599	488	602	485	827	593	708	534	803	581	953	590	809	547	Sept...	773	535
880	533	892	574	584	472	599	493	617	494	827	595	709	542	790	569	940	591	807	542	Dec...	774	535
893	539	897	579	594	477	622	495	617	494	827	595	711	543	791	570	968	629	810	551	1959 Mar...	781	540
919	554	945	599	594	477	624	498	620	499	840	595	711	544	804	583	978	639	832	560	Jun....	794	548
925	558	945	599	624	497	652	513	635	508	858	610	745	553	795	582	1016	652	836	566	Sept...	812	556
921	554	942	595	632	499	652	515	641	511	849	601	745	558	791	578	1008	643	823	554	Dec...	808	553
920	553	946	599	639	503	653	517	644	514	870	609	740	553	793	580	1011	646	833	565	1960 Mar...	813	555
944	562	966	608	633	498	654	518	649	517	885	618	755	562	830	585	1008	647	836	566	Jun...	827	561
943	560	964	605	650	501	674	526	640	507	885	621	755	561	830	589	1038	648	833	567	Sept...	831	563
944	562	964	605	653	504	674	526	649	508	885	626	753	559	830	590	1036	645	849	572	Dec...	831	562

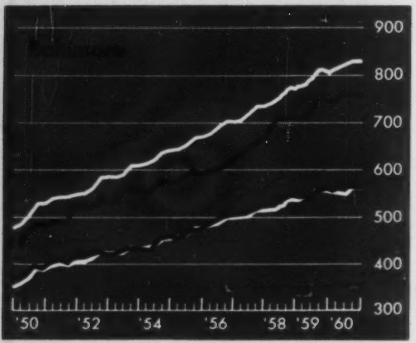




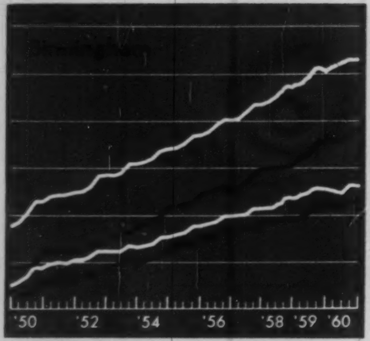


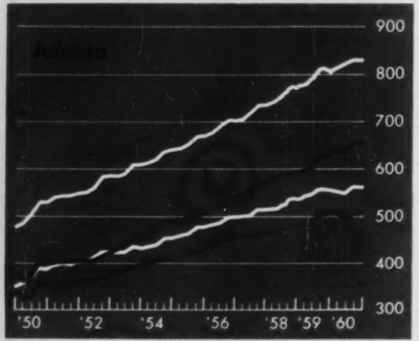


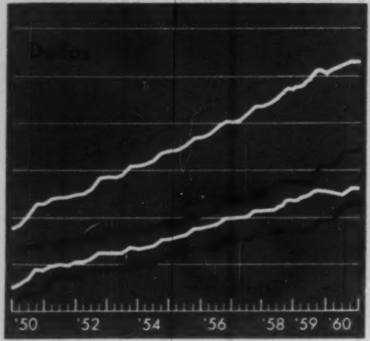


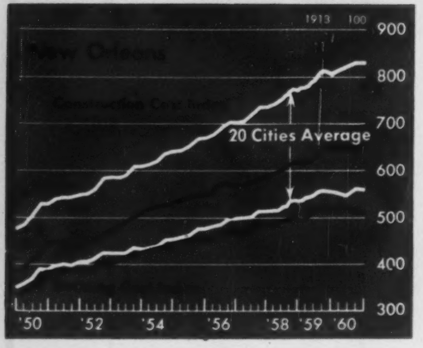


U. S. 20-CITIES		CANADA			
AVERAGE		MONTREAL		TORONTO	
Constr.	Bldg.	Constr.	Bldg.	Constr.	Bldg.
478	357	406	314	...	...
478	356	408	316	...	...
475	353	407	315	...	...
474	349	408	316	...	...
480	352	396	316	...	...
480	353	394	314	...	...
488	360	397	317	...	...
507	373	397	317	...	...
531	393	428	346	...	...
531	391	427	345	...	...
540	399	445	363	...	...
543	401	473	378	...	...
544	400	484	385	...	...
548	406	484	385	...	...
551	407	500	383	...	...
562	413	510	393	...	...
567	424	512	395	...	...
586	425	512	395	...	...
588	425	516	399	...	...
594	426	516	399	...	...
611	438	550	430	...	...
611	435	550	430	...	...
614	437	516	396	...	...
622	440	513	393	...	...
640	454	511	393	...	...
643	457	542	422	...	...
646	460	528	408	543	444
656	465	525	405	543	449
673	479	532	412	538	436
673	479	550	427	544	432
680	483	552	429	558	446
692	489	560	437	562	450
705	500	560	437	592	465
704	500	561	438	595	459
709	501	560	437	596	462
721	504	586	451	611	469
738	516	587	452	608	468
738	516	591	453	609	471
744	516	584	446	607	470
757	521	603	449	605	468
773	535	603	449	622	469
774	535	604	449	638	479
781	540	603	449	642	483
794	548	610	450	671	500
812	556	620	457	666	497
808	553	630	459	657	488
813	555	630	459	673	495
827	561	650	466	697	497
831	563	650	466	692	492
831	562	649	464	690	492









ENR Cost Indexes By Region And City

ENR COSTS REPORT AND OUTLOOK

$
BUILDING
1 ST
QUARTER

Job Ahead: Counter Rising Costs

Construction cost rises are coming this summer, if not sooner. This is the conclusion that no amount of wishful thinking could avoid when preparing this first quarter cost report. And while the report is focused particularly on building costs, it takes all types of construction into account. No type is immune from the cost-rise threat, and all the cost elements of construction are involved. The cost rise conclusion applies across the board.

Increases in labor costs are the most certain. Wage contracts already signed and the nature of wage negotiations under way combine to give the tipoff. Materials prices, too, can go up under the pressure of increased manufacturing costs. The signal would be enough increased construction activity to step up demand; and ENR's contract figures suggest that this will occur. Even construction equipment could be more costly, if steel prices rise.

With such a situation looming, the construction industry should take a new look at the gap between contractors' bid prices and the basic costs of labor and materials. For when this gap widens, as a result of these basic costs, measured by the ENR Cost Indexes, rising faster than the prices contractors get for their services, profits will be squeezed unless there is an accompanying rise in productivity.

A widening of the gap (see p. 58) has already taken place. And signs that profit squeezing is more dominant than productivity increases are painfully evident. Contractor failures in 1960, for one example, were up sharply on building construction, and up also, but moderately, on highway and heavy construction. As another, builders' profit ratios in 1959, as measured by Dun & Bradstreet's Roy A. Foulk, were down near their 10-year lows.

Both reasonable profits and high productivity are essential to the good health of the construction industry. But under present conditions the former are possible only as a result of the latter. And with labor costs accounting for the greatest increase in basic costs, a high order of labor-management statesmanship will be needed to regain the productivity necessary for a healthy, dynamic construction industry.

To meet this challenge this quarterly report on prices and price trends should prove a timely aid. It begins with the foldout on the left.

Where to Look...

• • • for the Indexes

Engineering News-Record's Construction Cost and Building Cost...........foldout opposite and 51, 52, 53, 54, 55

Throughout, the ENR general purpose Cost Indexes are shown as a framework for measuring how the special purpose cost or price indexes vary from the general and from each other ....for the cost outlook 58, 59

Roundup of Building and Construction Cost and Price Indexes 60, 61, 64

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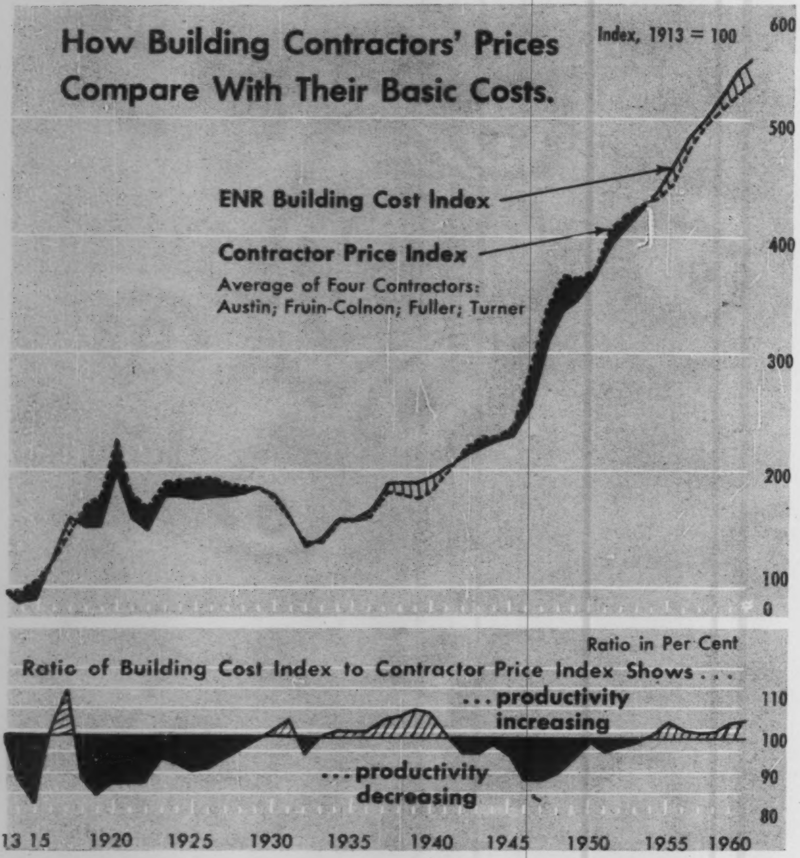
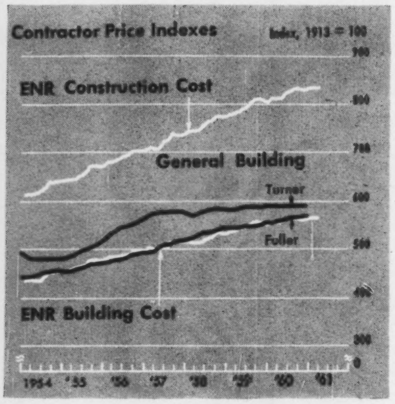
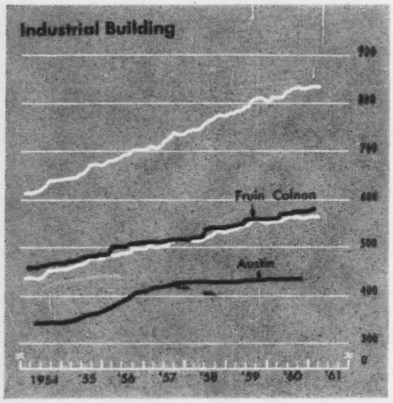
Starting This Spring: Steeper

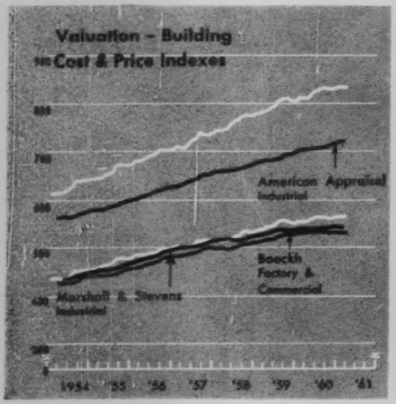


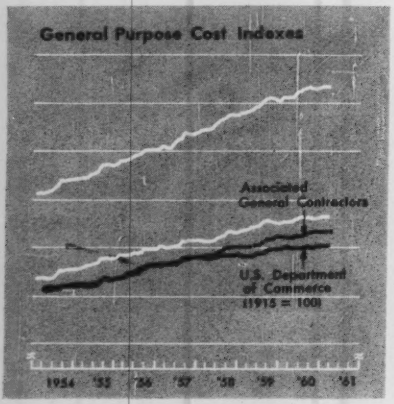


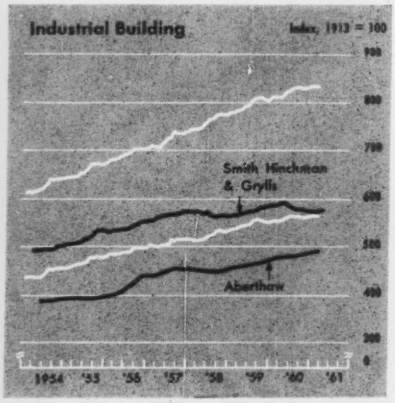


THE GAP between higher costs and lower bid prices (top left) is only partially made up by increased productivity (bottom left). The rest of the gap comes right out of profits. Mute testimony to that fact is the sharp rise in contractor failures in 1960. These charts illustrate the squeeze of profits for building contractors.

Charts on pages 76 and 77 show the same squeeze for heavy construction contractors. The ENR Building Cost Index (bottom white line in all charts) climbed 1.5%, during the year, as did also the four-contractor price average. The Austin and Turner held steady, Fuller is up 2.1%, and the Fruin-Colnon index is up 3.8%.







THE OTHER EXTREME movement in 1960 came in the special purpose price and cost indexes, a 3.4% drop in Smith, Hinchman & Grylls' industrial building price index. Of the general purpose cost indexes, ENR's Construction Cost is up 2.6% in the latest 12 months, Associated General Contractors' cost index is up 2.3%. The latest U. S. Department of Commerce weighted composite index is unchanged from 12 months earlier. But its 1960 average tops 1959 by 1.6%.

Upturn in Costs

Costs Roundup—1st Quarter

Any new look at contractor's bid prices—to counter the dangers of "profitless prosperity"—will have to consider impending steeper increases in basic costs.

Both building and construction costs are poised for a faster run up than the relatively "mild" cost increase witnessed last year. In the next nine months, look for a 3.4% rise in construction costs and a rise of 2.8% in building costs as measured by the ENR indexes. A steady climb in both common and skilled labor costs and higher prices for structural steel and lumber will spur the steeper cost increase.

Between now and June a round of deferred wage hikes goes into effect in several of the 20 major construction centers covered by ENR's cost indexes.

For common labor, deferred wage boosts averaging 11.6-cents-an-hour will take effect in seven of ENR's 20 cities. For skilled labor, deferred wage increases will average 15.9-cents-an-hour for bricklayers in seven cities, 15.0-cents-an-hour for carpenters in seven cities and 12.6-cents-an-hour for structural ironworkers in eight cities.

Perhaps more important than the wage increases already scheduled will be the outcome of new contracts to be negotiated. Between now and June 1, five common labor pacts, three bricklayers' contracts, three carpenters' contracts and four structural ironworkers' agreements will run out. Contracts negotiated to replace them should pretty much set the pace of labor negotiations to be carried on later this year. And any deferred increase provisions of these new pacts will have a profound influence on contractors' costs in 1962 and even '63.

Not only will the construction industry face higher labor costs this year, but, in sharp contrast to 1960, contractors cannot afford to discount the possibility of higher prices for basic materials. ENR forecasts that the second half of 1961 will see the first increase since 1958 in mill prices of standard structural shapes. The increase is expected to be moderate, boosting ENR's 3-mill price average 3.3% to $5.68 per cwt. Such an increase would almost certainly be reflected in higher list prices for construction equipment and could easily touch off "sympathetic" price rises, in other construction materials.

A reversal of the downtrend in lumber prices is another unpleasant possibility that contractors must face this year. Prices have been skidding since the summer of 1959 carrying West Coast mill local and yard prices of Douglas fir 2x4s to the lowest levels since 1958. The price decline reflected a drastic downtrend in orders because of last year's housing slump. But in the past few weeks, the first signs of a pickup in orders appeared. Since the first week in February average fir lumber order backlogs at West Coast mills have grown 27%, while average inventory has risen only 6%. This isn't as dramatic as it sounds when you consider the huge amount of lumber the mills have on their hands. But it could be a straw in the wind. The increased demand has boosted mill prices about $5 per thousand board-feet from the extreme lows hit three months ago.

Southern pine lumber prices, which have been much more stable than fir, also could swing upward if higher minimum wage legislation is passed this year.

All in all, with ENR's contract award figures flagging a sharp upswing in construction activity and hence greater lumber demand this year, it would seem prudent for contractors to figure on at least a moderate increase in lumber prices.

Plywood sheathing and concrete form plywood prices may swing higher before long. The industry is still rocking under the effects of the catastrophic failure of an elaborate attempt by some plywood producers to boost prices by curtailing production. But in the last few weeks, there has been a "better tone" in the sheathing and plyform markets. The mills' order files are a little fatter and some sheathing has moved out at prices $7 per Msf above the extreme lows hit after the collapse of the production cutback plan.

Another radar blip of possible higher sheathing prices on the horizon is a scheduled price increase for green veneer, sheathing's basic component.

As far as plyform is concerned, a widely respected market observer describes its current market as "really husky." The '61 bulge in heavy construction ought to make the plyform market even "huskier."

Last week, Pacific Northwest mills jumped concrete form prices $5 per thousand square feet. A further $2 increase this week appears certain.

One major material that the construction industry need have no price worries about this year is cement. Despite higher labor costs and a tighter federal income tax depletion allowance, manufacturers are holding the price line. ENR's 20-cities average of bulk cement prices increased only one cent per bbl in the first quarter. Most manufacturers have guaranteed mill prices throughout 1961.

A major factor working towards higher construction materials prices this year is an all-out drive by James Hoffa's Teamsters Union to extend a contract, which granted a very large wage increase in the Midwest, to other sections of the nation. Truck delivery is becoming more and more prevalent throughout the construction industry. On the West Coast, for example, Oregon lumber mills think nothing of direct truck deliveries to jobs in the San Francisco area.

Construction equipment may be a cost trouble spot this year. Despite a sales decline, equipment list prices crept up to record highs last year (see p. 78). With a stepped up construction market and a possible steel price rise, don't be surprised if equipment prices climb to new peaks in 1961. As a matter of fact, one big manufacturer jumped the gun recently and announced an "across the board" 5% hike in its prices. But remember, we're talking about manufacturers' list prices. The "real" equipment market will continue to reflect local distributors' inventory situations and the ability of the equipment buyer to make a "deal".

The cost of long-term borrowing for construction will probably hit its low point in the second quarter—if the low has not already been seen. With President Kennedy's imprimatur, the Federal Reserve Board has moved into the market for intermediate-term U. S. Government bonds (5-10-year maturity). The initial impact of this buying by the Fed was to boost government bond prices, thus trimming yields. Lower yields for governments brought pressure on prime industrial and municipal yields.

The big question mark is the Fed's "open-market" policy from now on. Buying of intermediate-term governments will probably continue. And if the Fed starts bidding for longer-term bonds, the effect would be lower yields on corporate and municipal bonds.

This possibility makes it wise for buyers of construction projects to plan on utilizing the months just ahead for new financing. Interest rates will almost certainly be higher later in the year, when an economic pickup and looming federal deficits may trigger easier bond prices (higher yields). This course is particularly advisable for agencies responsible for financing new public works.

What the Cost Indexes Are and

Each of the indexes shown here is designed to accomplish a well defined purpose. These measures of movements and trends in costs and prices range from general purpose to highly restricted special purpose indexes.

Costs, as used here, are what the contractor pays for labor and materials —prices are what he is paid for his finished product. In between are overhead, productivity and profit.

To help you select the index best suited to your needs these thumb nail sketches show how each is computed:

- **Aberthaw Co., Boston, Mass.**—Since March 31, 1946, this index is a composite of 36 major cost items in three multi-story and two one-story New England industrial buildings, including all mechanical trades, repriced using actual and estimated labor and material costs. Before March 31, 1946, it was based on New England seven-story and basement, 62 ft 4 in. x 202 ft 4 in., reinforced concrete building built in 1914. Quarterly through December, 1956; semiannual beginning 1957.

- **American Appraisal Co., Milwaukee, Wis**—Index is based on detailed analysis of four types of industrial building structures (frame, brick, concrete, and steel) in 30 representative cities.

This index is re-priced in accordance with prevailing wage scales and labor performance for the various building trades and quotations for construction materials. It corrects for labor productivity but assumes normal average conditions and does not recognize overtime or bonus payments to labor or premiums paid for materials under temporary abnormal conditions. Monthly.

Industrial Building Cost Index

1913 = 100

30-cities average and 22 individual cities.

U. S. Aver.,	'26	'32	'39	'42	'45	'49	'58	'59	'60	Dec. '60
30-cities aver.	217	155	200	241	271	490	682	704	722	731
Boston	224	169	210	248	270	485	706	733	743	755
New York	234	170	219	248	272	503	735	764	783	796
Buffalo	219	157	205	247	279	506	724	746	768	784
Baltimore	224	166	198	248	277	510	692	713	732	738
Philadelphia	225	161	196	247	275	481	671	684	705	726
Pittsburgh	236	172	219	249	279	486	665	689	706	718
Cincinnati	217	157	209	242	272	477	666	683	705	714
Cleveland	233	160	206	245	268	485	681	700	722	727
Chicago	219	162	205	235	260	452	626	644	658	661
Indianapolis	219	157	206	247	276	501	691	701	715	724
Detroit	224	148	208	252	278	500	724	743	767	776
Milwaukee	218	144	209	254	280	493	710	728	747	755
Minneapolis	197	148	202	235	266	453	648	669	684	696
Kansas City	220	156	209	239	268	469	622	636	651	663
St. Louis	230	163	208	238	265	478	669	683	700	710
Atlanta	211	147	186	240	278	514	742	771	793	806
Dallas	204	146	171	209	246	455	607	625	632	640
New Orleans	217	145	194	234	277	501	687	708	727	739
Denver	204	149	195	226	245	441	598	619	633	634
Seattle	199	141	196	244	277	509	654	688	707	705
San Francisco	188	144	183	225	244	446	631	655	677	691
Los Angeles	195	141	167	213	249	475	649	679	706	715

How the ENR Cost Indexes Work

The ENGINEERING NEWS-RECORD CONSTRUCTION and BUILDING COST INDEXES result from repricing two hypothetical blocks of construction. Both are shown in historical detail in the foldout chart opposite page 57.

The CONSTRUCTION COST Index is the parent, established in 1921 to diagnose and track the wild fluctuations in prices after World War I. It was carried back to 1913 by months and to 1903 by years. Its moving parts are steel, lumber, cement and common labor, including fringe benefits.

The BUILDING COST Index was a depression baby, established in 1938 when common labor rates started rising much faster than those for common labor. It could be carried back only to 1922 by months and 1913 by years. Its moving parts are steel, lumber, cement and skilled labor, an average of ironworker, bricklayer and carpenter rates, including fringe benefits.

These components are given the following weightings to create the two hypothetical blocks of construction to be priced:

		Index Quantities	
Components	Unit	Construction Cost	Building Cost
Labor, common	hr	200	0
skilled	hr	0	68.38
Steel, structural	cwt	25	25
Lumber, 2x4s S4S	Mbf	1.088	1.088
Cement	bbl	6	6

These indexes measure movements and trends in basic materials and labor costs without correction up or down for low or high productivity of management and labor on the job. In times of low productivity, contractors' selling prices tend to rise faster than the index; when productivity is higher they drop below the ENR index trend. (See the graphs on page 58.)

Both Indexes are repriced weekly for 20 U.S. cities and for two in Canada. They are published every Friday in CONSTRUCTION DAILY in full detail with components for all 22 cities. The 20-cities averages are reported each week in ENGINEERING NEWS-RECORD. The official monthly values are carried in ENR each month for all 22 cities, also in a 12-month review of the 20-cities U.S. average on the "Scoreboard" page preceding the Business Section.

The ENR Indexes are continued on their original 1913=100 base because they are written into many legal documents and are widely used in this form. But they can be converted at will to other bases. Some typical conversion ratios follow, also a general formula for do-it-yourself converting.

To convert 20-cities indexes from 1913=100 base to base year below . . .	. . . Divide 1913=100 values of Construction Cost Index by . . .	Building Cost Index by . . .
1949=100	4.7702	3.5179
1947-49=100	4.5033	3.3642
1940=100	2.4196	2.0281
1939=100	2.3551	1.9744
1926=100	2.0803	1.8496
1925-29=100	2.0695	1.8657
1926-29=100	2.0702	1.8747
1929=100	2.0202	1.9086
1910-14=100	0.9380	......
1924=100	2.1536	1.8578
1923-25=100	2.1205	1.8481
1914=100	0.8856	0.9191
1911=100	0.9343	......

Conversions to other base years are made by simple ratios:

$$I_{nb} = \frac{I_{ob}}{I_{nby}} \times 100$$

where
I_{nb} is index on new base
I_{ob} is index value on old base
I_{nby} is old base index value for new base year

- **Associated General Contractors of America CAGC), Washington, D. C.**—Wages and materials for 12 cities combined in 40-60 ratio. Wages are prevailing rates for hod carriers and common labor. Materials are weighted: sand, gravel, and crushed stone, 1; cement, 1; lumber, 1; hollow tile, ½; structural and reinforcing steel, ½. No adjustment for productivity. Monthly.

- **Austin Co., Cleveland, Ohio.**—Reprices typical one-story, steel frame, monitor-type industrial building. Includes concrete foundations, brick curtain walls, continuous steel sash, concrete floor laid on ground, 2 in. wood roof deck on timber purlins covered with four-ply waterproofing, monitor sash with mechanical operators, but no heating, lighting, plumbing, sprinkler, or other services. Priced for central and eastern states. Quarterly.

- **E. H. Boeckh & Associates, Inc., Washington, D. C.**—20-cities average for five commercial and factory buildings price indexes used here. Similar averages are available for each of the 10 classes of buildings reported. See page 67 for values for 10 classes of buildings in 21 of the 52 U. S. areas covered. In addition, five areas in Canada are covered for all 10 types of buildings. Calculated by actual survey at source of materials prices paid by contractors and current labor rates (certain corrections being made in some areas for labor efficiency or shortage). Index includes construction overhead, sales taxes, compensation insurance, social security and contractor's profit. Indexes are primarily engineered to use as local cost conversion factors construction cost data released by Boeckh in "Boeckh's Manual of Appraisals" and monthly publication "Building Costs".

How they Work

Construction and Building Cost Indexes Compared

	Bases=100		Annual Averages																	
NAME, AREA & TYPE	Orig	Used Here	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
General Purpose Cost Indexes																				
ENR Construction Cost, 20-cities aver†	1913	Same	207	208	206	207	207	203	181	157	170	198	196	206	235	236	236	241	258	276
ENR Building Cost, 20-cities aver†	1913	Same	183	185	186	188	191	185	168	141	148	167	166	172	196	197	197	203	211	222
Assoc. General Contractors, 12-cities aver†	1913	Same	199	197	200	199	203	200	196	171	163	178	176	179	188	189	188	189	198	209
U. S. Dept of Commerce, composite	1947–49	1915	179	179	178	178	182	176	162	140	153	170	164	170	181	182	175	179	193	216
Contractor Price Indexes—Building																				
Aberthaw, New England, Industrial	1913	Same	195	197	193	191	190	186	176	168	170	176	177	184	199	191	190	193	208	223
Austin, Central & Eastern, Industrial	1926	1913	185	185	178	172	170	155	131	117	117	128	139	150	165	161	152	163	198	213
Fruin-Colnon, St. Louis, Mo., Industrial	1926	1913	222	218	214	213	211	207	196	178	181	191	185	188	210	207	208	211	220	227
Fuller, Eastern Cities, General	1913	Same	193	202	197	196	201	199	180	157	155	171	167	168	187	192	195	196	206	220
Turner, Eastern Cities, General	1939	1913	195	195	190	190	185	165	145	136	140	160	162	169	192	188	182	194	217	245
Smith Hinchman & Grylls, Detroit General	1926	1913	187	185	185	188	190	181	148	128	137	157	161	173	200	200	199	204	217	226
Public Utility Cost Indexes																				
Handy-Whitman, Pacific Div., Reinf. Conc.	1911–14	Same	197	192	188	188	192	180	166	150	154	174	174	179	196	194	193	195	218	241
ICC Railroad US aver., Station & Office	1910–14	Same	188	184	189	188	187	182	165	141	145	151	151	157	166	166	166	177	188	208
Valuation Indexes																				
American Appraisal, 30-cities, Industrial*	1913	Same	217	217	217	217	217	200	178	155	150	161	162	170	198	199	200	204	217	241
E. H. Boeckh, 20 areas, Comm'l & Factory*	1926–29	1913	179	181	178	179	184	181	168	144	148	161	159	163	183	189	191	195	204	214
Marshall & Stevens, nat'l aver., Industrial	1926	1913	185	185	183	185	179	165	156	130	143	157	164	166	181	179	183	190	203	218

NAME, AREA & TYPE			1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
General Purpose Cost Indexes																				
ENR Construction Cost, 20-cities aver†	1913	Same	290	299	308	346	413	461	477	510	543	569	600	628	660	692	724	759	797	824
ENR Building Cost, 20-cities aver†	1913	Same	229	235	239	262	313	345	352	375	401	416	431	446	469	491	509	525	548	559
Assoc. General Contractors, 12-cities aver†	1913	Same	216	223	231	257	296	332	342	357	377	388	408	426	439	462	483	499	517	534
U. S. Dept of Commerce, composite	1947–49	1915	228	227	235	260	320	366	363	375	406	419	429	428	440	465	482	486	496	504
Contractor Price Indexes—Building																				
Aberthaw, New England, Industrial	1913	Same	225	227	236	279	304	321	312	321	370	381	388	394	398	427	453	453	473	486
Austin, Central & Eastern, Industrial	1926	1913	215	223	234	273	301	317	307	313	337	342	347	352	366	400	420	427	429	431
Fruin-Colnon, St. Louis, Industrial	1926	1913	235	241	247	285	347	382	382	398	433	449	460	469	483	503	512	530	551	571
Fuller, Eastern Cities, General	1913	Same	238	240	241	290	354	380	382	377	405	416	429	450	462	482	504	526	545	559
Turner, Eastern Cities, General	1939	1913	257	244	258	318	382	424	413	427	478	493	500	489	498	544	576	576	587	589
Smith, Hinchman & Grylls, Detroit, General	1926	1913	245	264	285	319	371	405	395	426	476	499	504	500	522	544	568	565	575	583
Public Utility Cost Indexes—Building																				
Handy-Whitman, Pacific Div., Reinf Conc.	1911–14	Same	243	245	249	292	347	403	417	436	463	470	495	515	543	597	639	654	676	682
ICC Railroad, US aver, Station & Office	1910–14	Same	219	227	244	291	333	364	368	390	412	426	438	442	460	490	500	515	531	na
Valuation Indexes																				
American Appraisal, 30-cities, Industrial*	1913	Same	252	261	271	322	430	490	490	500	532	553	577	592	608	635	663	682	704	722
E. H. Boeckh, 20-areas; Comm'l & Factory*	1926–29	1913	223	238	252	275	323	365	369	368	415	430	445	450	465	489	507	517	535	544
Marshall & Stevens, nat'l aver., Industrial	1926	1913	227	235	248	288	338	368	365	390	430	436	448	459	479	503	515	528	544	554

* Adjusted for productivity.
† No adjustment for productivity

1961 Values to date: ENR Constr Cost: Jan., Feb., 834 Mar. 834 ENR Bldg Cost: Jan., Feb., 563 Mar. 563 Fruin-Colnon: Jan 577
Fuller: Jan. 563 Turner: Jan. 589 Smith, Hinchman & Grylls: Jan. 570. Assoc Gen. Contractors: Jan. 539

Complete formula is published in "Boeckh's Index Calculator Table".

• **Fruin-Colnon Contracting Co., St. Louis, Mo.**—Five industrial buildings in St. Louis re-priced with contractor's actual and estimated material and labor costs. Monthly.

• **George A. Fuller Co., New York, N. Y.**—Based on price movements of all materials and labor needed to construct four typical buildings: two in commerce, one in industry, and one purely monumental, modified through the years to include all modern innovations of engineering and architecture, such as high-speed elevators, modern lighting cantilever construction, lightweight aggregates, etc. Re-priced quarterly on basis of company's experience.

• **Marshall and Stevens, Inc., Los Angeles, Calif.**—A national average with a system of modifiers to get regional and municipal values for each of four types of BUILDINGS; A—Fireproof, protected steel; B—Fireproof, reinforced concrete; C—Masonry buildings; D—Frame. They are designed to reflect normal costs in line with recognized or published prices of building materials, equipment, and labor. Extraordinary or intangible conditions are not included. Quarterly and annual for ENR. (See also industrial EQUIPMENT cost indexes on p. 75.)

• **Port of New York Authority**—Hangar Cost Index is based on a hangar built in New York City in 1940. It includes 13 elements representing almost 76% of the total structural and mechanical cost. It excludes interior finish, mechanical trades and electrical work. The items used, each repriced "in place" for a combined labor and materials sub-total, include excavation and fill, concrete piles, concrete (forms, concrete, reinforcing) foundations and floors, metal doors and windows, masonry, structural iron and steel, roofing and sheet metal.

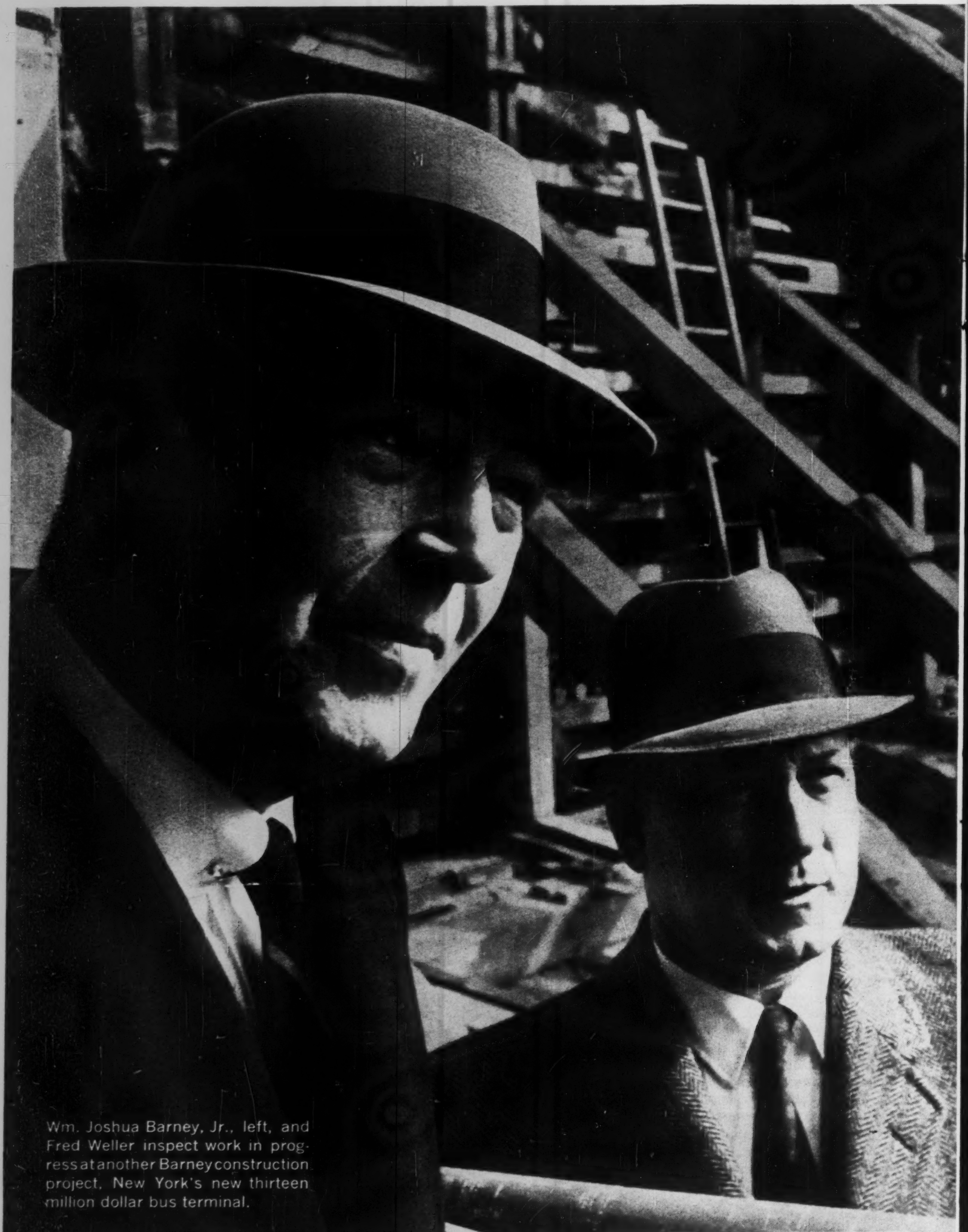
This index is not adjusted for design changes, longer spans or higher clearance.

Port of NY Hangar Cost Index

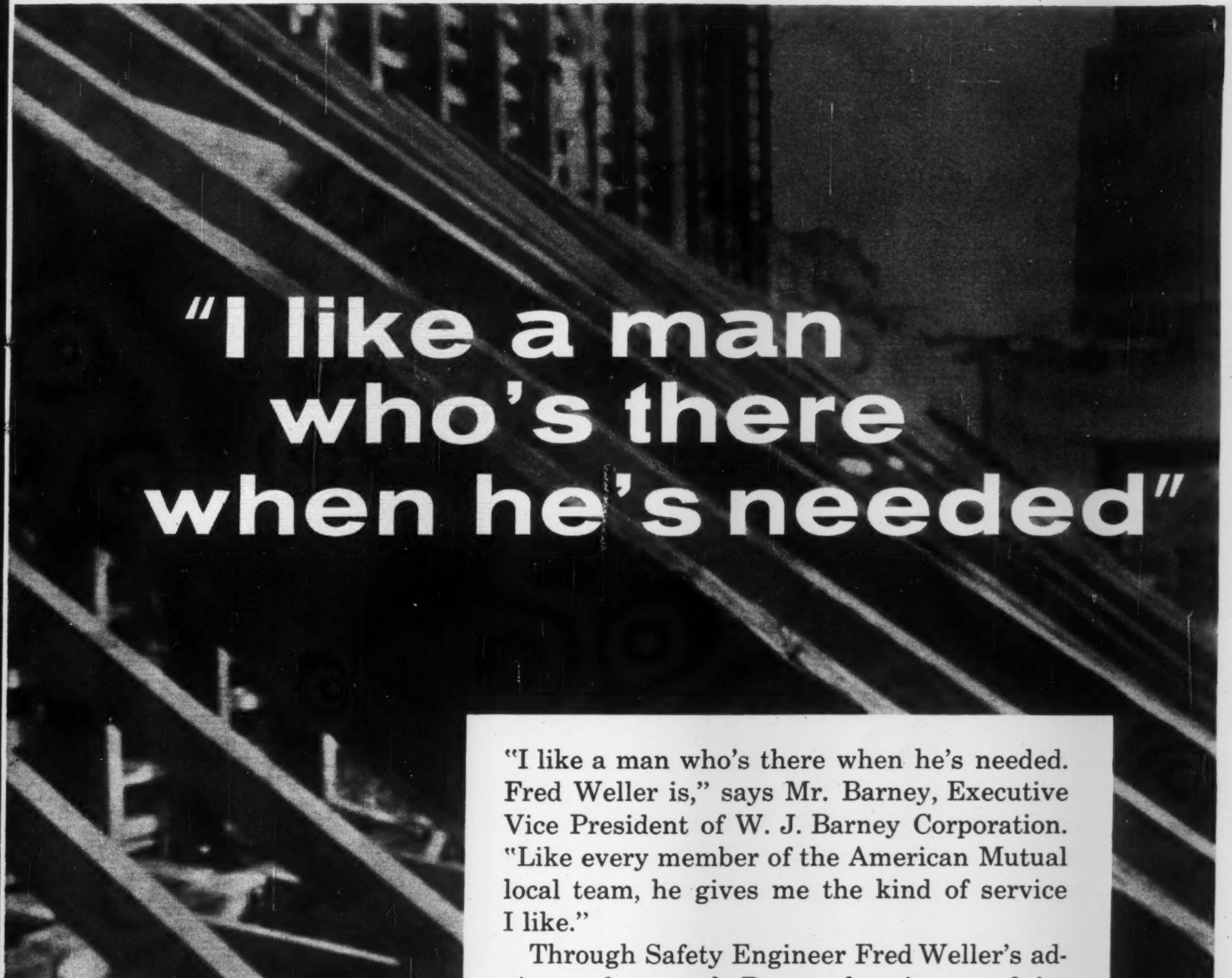
Base: 1939 = 100

1939	**1940**	**1941**	**1942**	**1943**	**1944**	**1945**	**1946**	**1947**
100	101	102	104	105	106	110	121	136
1948	**1949**	**1950**	**1951**	**1952**	**1953**	**1954**	**1955**	**1956**
155	162	170	180	185	194	206	216	231
1957	**1958**	**1959**	**1960**					
245	254	264	268					

• **Smith Hinchman & Grylls, Inc., Architect-Engineers, Detroit, Mich.**—Actual in-place costs, using building materials costs, freight rates, skilled and unskilled labor rates and including labor efficiency and



Wm. Joshua Barney, Jr., left, and Fred Weller inspect work in progress at another Barney construction project, New York's new thirteen million dollar bus terminal.



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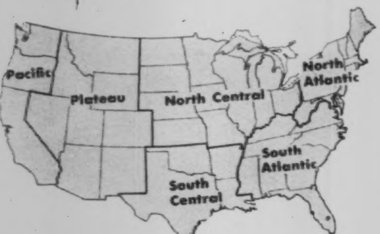
CIRCLE 63 ON READER SERVICE CARD

. . . Building Costs Indexes

premiums, bidding competition, contractors profit margins and overhead. Figured with the contractor overhead are taxes, duration of projects, material expediting, and labor procurement. Monthly.

• **Turner Construction Co., New York, N. Y.**—Eastern cities. Own cost experience on labor rates, material prices, productivity of labor, efficiency of plant and management, competitive conditions, forecast of price trends. Quarterly.

• **Handy-Whitman, Whitman, Requardt & Associates, Inc., Baltimore.**—Reinforced concrete building in the Pacific Division series from the adjoining table is used in roundup table on p. 61.



• **Railroad Construction Cost Indexes ICC, Washington, D. C.**—Stations and office building series used on table, p. 61 is from annual report by Engineering Section, Bureau of Accounts, Cost Finding and Valuation, Interstate Commerce Commission. See ENR Sept. 22, 1960, p. 67.

• **U. S. Dept. of Commerce Composite Cost Index** weights special purpose and general construction cost and price indexes by estimated dollar volume of work put in place.

On some types of work, two indexes are used, one special purpose for deflating, the other, available monthly, for extrapolating.

By classes of construction the indexes used are residential, Boeckh; industrial building, Turner & Boeckh; warehouses office and loft buildings, Fuller & Boeckh; other private and public buildings, American Appraisal; farm dwellings, Bu of Agriculture Economics & Boeckh; farm service buildings, BAE & Amer Appr; railroad, ICCRR & ENR Construction; telephone & telegraph, ICCT&T&ENRC; electric and gas utilities, Handy-Whitman & ENRC; petroleum pipeline, HW & ENRC, ICC & ENRC; all other private, aver ENRC & Assoc. General Contractors. Military and Naval, aver of Amer Appr, Bu of Public Roads, ENRC, Fuller & Boeckh, Turner & Boeckh; highway, Bu PR & ENRC; sewer & water, aver AGC & ENRC; misc public service, aver HW & ENRC; conservation & development and all other, aver of AGC & ENRC.

Monthly dollar volume estimates for each type of construction are deflated by the appropriate indexes. The sum of all deflated segments is divided into the estimated total in current dollars. Monthly.

Handy-Whitman Public Utility Cost Indexes

Individual series for 103 cost elements in three classes of utility construction, for six geographic divisions of the United States, are reported semi-annually by Whitman, Requardt and Associates, Baltimore, Md. Weighting is based on experience in cost analysis of plants and building. Material prices are from ENGINEERING NEWS-RECORD, IRON AGE and various manufacturers; labor rates from BLS, unions and builders associations.

Building Construction (1911-14 = 100)

(Complete Index reports 14 Items entering into Building Construction Costs)
A relates to Reinforced Concrete Bldg.; B relates to Brick Bldg.

	Jan. '26	Jan. '32	July '32	Jan. '39	Jan. '42	Jan. '45	Jan. '49	Jan. '50	Jan. '51	Jan. '52	Jan. '53	Jan. '54	Jan. '55	Jan. '56	Jan. '57	Jan. '58	July '58	Jan. '59	July '59	Jan. '60	July '60	Jan. '61
North Atlantic Division: Conn., Del., Me., Md., Mass., N. J., N. Y., Pa., R. I., Vt., W. Va.																						
A	213	171	159	205	250	259	436	437	473	481	496	526	540	608	656	679	688	694	710	711	718	694
B	228	189	173	211	246	262	429	424	460	475	478	504	521	569	599	622	633	639	652	656	665	655
South Atlantic Division: Ala., Fla., Ga., Ky., N. C., S. C., Tenn., Va.																						
A	213	171	164	204	260	274	462	465	491	510	527	562	578	642	695	717	721	729	746	755	761	736
B	226	185	176	209	255	272	431	434	456	485	494	524	543	589	625	645	653	660	675	682	691	680
North Central Division: Ill., Ind., Iowa, Kan., Mich., Minn., Mo., Neb., N. D., Ohio, S. D.																						
A	203	169	154	200	237	249	421	423	463	472	492	519	533	595	642	664	673	679	698	697	707	677
B	212	181	164	203	229	248	389	394	433	442	459	487	503	545	579	600	612	616	634	635	645	631
South Central Division: Ark., La., Okla., Tex.																						
A	192	149	144	188	232	242	411	418	445	454	471	499	508	566	617	634	641	647	662	663	675	649
B	203	160	154	191	223	235	382	387	408	426	445	466	478	520	567	584	594	600	613	615	628	616
Plateau Division: Ariz., Colo., Idaho, Mont., Nev., N. M., Utah, Wyo.																						
A	198	153	149	194	230	238	402	400	435	451	471	479	499	556	610	627	636	637	649	652	653	628
B	211	167	163	199	221	231	396	396	427	443	458	465	485	520	558	564	549	552	585	587	602	590
Pacific Division: Calif., Ore., Wash.																						
A	191	157	148	192	238	248	416	420	458	466	477	501	524	588	624	644	655	660	683	679	692	663
B	198	164	156	193	226	241	386	389	419	438	448	465	488	536	561	581	596	601	623	625	642	631

Gas Plant Construction (1911 = 100)

(Complete Index reports 25 Items entering into Gas Plant Construction Costs.)
A relates to Total Constr. & Equip; B relates to Mech. Equip. Exclusive of Gas Holders.

	Jan. '26	Jan. '32	July '32	Jan. '39	Jan. '42	Jan. '45	Jan. '49	Jan. '50	Jan. '51	Jan. '52	Jan. '53	Jan. '54	Jan. '55	Jan. '56	Jan. '57	Jan. '58	July '58	Jan. '59	July '59	Jan. '60	July '60	Jan. '60
North Atlantic Division: Conn., Del., Me., Md., N. J., N. Y., Pa., R. I., Vt., W. Va.																						
A	230	202	188	241	272	283	475	467	514	527	540	577	600	648	695	734	745	760	776	780	791	797
B	212	209	195	274	297	296	481	479	549	553	567	606	615	672	772	816	823	849	854	844	844	841
South Atlantic Division: Ala., Fla., Ga., Ky., N. C., S. C., Tenn., Va.																						
A	219	178	175	227	261	278	464	456	492	510	525	560	581	623	678	714	721	737	749	753	765	773
B	212	209	195	274	297	296	481	479	549	553	567	606	615	672	772	816	823	849	854	844	844	841
North Central Division: Ill., Ind., Iowa, Kan., Mich., Minn., Mo., Neb., N. D., Ohio, S. D.																						
A	217	198	178	232	249	264	441	437	481	491	508	545	565	602	648	684	694	706	719	721	731	735
B	212	209	195	274	297	296	481	479	549	553	567	606	615	672	772	816	823	849	854	844	844	841
South Central Division: Ark., La., Okla., Tex.																						
A	199	171	160	216	244	258	426	425	465	474	479	510	532	566	614	648	655	667	677	680	689	694
B	212	209	195	274	297	296	481	479	549	553	567	606	615	672	772	816	823	849	854	844	844	841
Plateau Division: Ariz., Colo., Idaho, Mont., Nev., N. M., Utah, Wyo.																						
A	202	176	166	216	232	240	409	401	440	453	467	489	511	545	595	623	630	641	653	656	663	667
B	212	209	195	274	297	296	481	479	549	553	567	606	615	672	772	816	823	849	854	844	844	841
Pacific Division: Calif., Ore., Wash.																						
A	205	187	177	227	253	264	439	433	475	489	498	529	555	599	638	673	688	699	715	717	736	740
B	212	209	195	274	297	296	481	479	549	553	567	606	615	672	772	816	823	849	854	844	844	841

Electric Light and Power Construction (1911 = 100)

(Complete Index reports 64 Items entering into Electric Light and Power Construction Costs)
A relates to Total Constr. & Equip. All steam; B to Accessory Electric Equipment; C to Sub-Sta. Equip.

	Jan. '26	Jan. '32	July '32	Jan '39	Jan. '42	Jan. '45	Jan. '49	Jan. '50	Jan. '51	Jan. '52	Jan. '53	Jan. '54	Jan. '55	Jan '56	Jan. '57	Jan. '58	July '58	Jan. '59	July '59	Jan. '60	July '60	Jan. '61
North Atlantic Division: Conn., Del., Me., Md., Mass., N. J., N. Y., Pa., R. I., Vt., W. Va.																						
A	197	182	176	224	248	251	407	399	462	472	481	509	519	555	599	620	627	635	641	635	641	631
B	197	192	186	225	241	226	340	341	413	420	426	457	461	463	520	536	543	545	548	517	518	451
C	184	172	168	203	217	207	306	312	352	359	365	392	396	417	457	477	484	485	487	471	475	456
South Atlantic Division: Ala., Fla., Ga., Ky., N. C., S. C., Tenn., Va.																						
A	201	188	180	232	262	268	430	422	482	494	506	539	551	589	641	662	667	678	685	677	683	673
B	200	200	191	239	260	247	357	358	426	432	438	474	485	484	542	562	564	571	576	545	543	477
C	187	180	173	217	235	227	322	327	365	370	377	409	419	439	479	502	506	510	515	499	500	481
North Central Division: Ill., Ind., Iowa, Kan., Mich., Minn., Mo., Neb., N. D., Ohio, S. D																						
A	190	186	174	219	235	238	375	374	436	446	458	488	498	533	575	595	601	609	616	608	615	603
B	189	199	186	224	229	216	309	310	376	388	388	418	425	429	477	492	497	501	507	476	479	416
C	178	181	169	203	207	198	278	282	320	328	332	359	365	388	419	438	444	446	451	434	440	420
South Central Division: Ark., La., Okla., Tex.																						
A	184	179	171	218	245	248	391	390	448	458	468	498	508	541	591	611	617	623	629	621	629	618
B	187	200	190	231	250	235	341	340	407	416	420	454	462	461	517	533	539	543	547	516	519	452
C	175	181	173	210	226	217	310	311	344	352	356	386	394	412	450	470	476	478	482	466	471	451
Plateau Division: Ariz., Colo., Idaho, Mont., Nev., N. M., Utah, Wyo.																						
A	190	177	171	218	234	238	378	376	436	447	460	484	495	527	578	601	604	612	623	614	618	608
B	197	194	188	231	237	225	322	323	390	401	407	435	441	435	482	508	509	513	526	494	496	431
C	185	175	171	209	213	207	289	294	332	342	348	374	378	392	422	451	453	455	467	450	454	434
Pacific Division: Calif., Ore., Wash.																						
A	180	172	163	216	235	242	383	379	440	454	461	487	499	535	578	600	608	617	625	618	630	621
B	178	182	170	222	231	225	328	323	394	409	409	436	440	446	496	517	520	528	537	503	516	452
C	167	164	155	203	210	208	298	297	342	357	358	382	385	411	444	469	473	480	487	478	483	462

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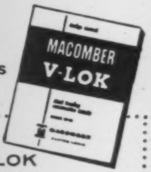
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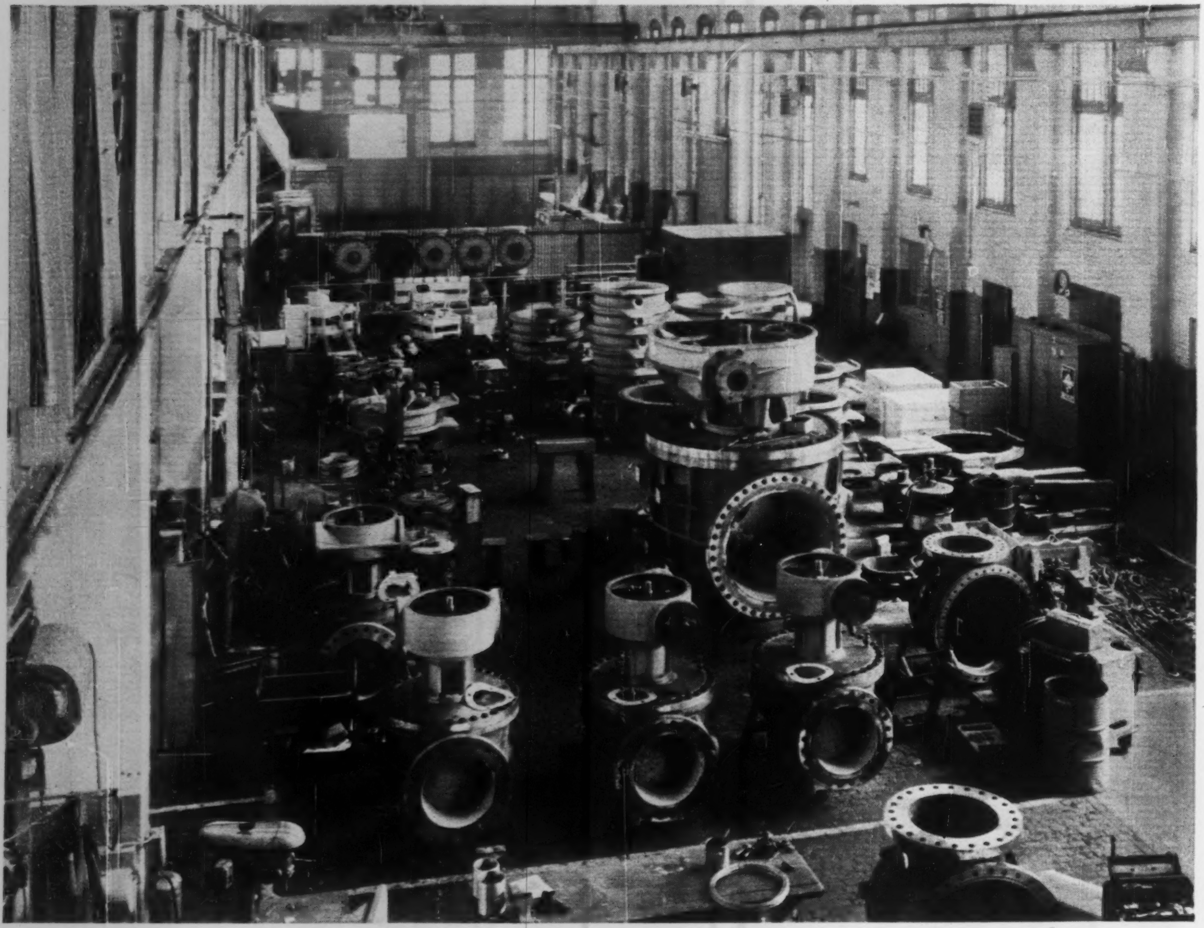

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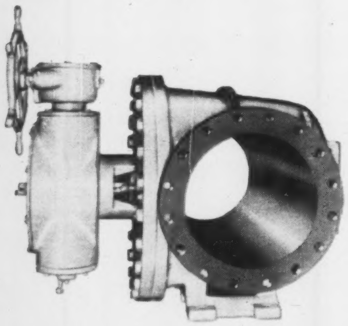

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Cost Indexes for 10 Types of Buildings

By E. H. Boeckh & Assoc., Inc., Washington, D. C.

U. S. Average 1926-'29 = 100

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
U. S. Average										
1926–29	101.4	102.5	102.5	102.8	101.3	102.2	100.8	101.7	102.2	104.6
1939	101.2	104.4	104.1	111.2	109.4	101.3	110.4	105.0	112.1	113.3
1949	213.8	215.6	215.0	208.1	208.4	218.4	195.5	211.9	208.7	211.4
1958	274.9	284.5	283.9	294.9	286.4	279.8	291.1	284.5	304.8	306.0
1959	284.0	293.9	293.2	306.2	296.4	289.8	300.4	293.1	315.8	318.1
1960	288.4	299.2	297.8	313.6	302.3	294.4	302.6	298.5	321.2	326.2
Jan. 1961	286.5	298.2	296.4	315.6	302.5	292.2	300.1	298.2	320.8	329.0
Atlanta Area										
1926–29	82.7	87.0	84.2	83.7	87.0	82.9	94.5	84.7	87.5	86.8
1939	82.8	86.0	86.1	95.1	95.0	80.6	96.2	88.6	94.6	97.4
1949	189.9	189.3	189.3	180.6	185.4	191.7	172.7	186.5	177.5	180.8
1958	239.8	243.9	243.8	255.7	253.7	243.2	264.5	243.6	262.0	261.9
1959	247.7	252.2	252.2	266.1	262.8	252.0	273.7	251.4	273.1	272.7
1960	253.3	259.2	258.5	274.7	269.3	257.2	275.3	259.1	278.8	282.5
Jan. 1961	252.0	259.1	258.0	276.5	270.2	255.5	272.5	259.5	278.8	285.2
Baltimore Area										
1926–29	107.2	112.0	107.6	100.6	100.7	106.3	95.5	106.8	96.8	101.2
1939	93.5	95.5	95.6	99.3	99.2	94.0	101.7	96.6	101.4	100.2
1949	216.4	217.4	217.3	204.5	204.8	220.5	191.8	216.6	204.6	208.5
1958	272.1	277.8	278.3	281.6	277.3	277.2	284.4	276.7	293.0	290.1
1959	279.2	285.6	286.5	291.7	285.7	284.9	292.4	284.3	302.5	301.6
1960	282.9	289.9	289.5	297.9	290.0	289.1	293.4	287.7	306.2	307.2
Jan. 1961	277.3	285.4	284.3	296.9	287.5	282.6	285.2	284.7	301.5	306.4
Birmingham Area										
1926–29	91.7	96.7	94.1	95.5	96.8	90.2	97.5	94.6	96.3	96.3
1939	87.8	90.9	91.5	96.1	96.2	84.9	96.9	95.1	95.6	96.3
1949	188.2	187.2	187.6	178.9	182.0	192.8	172.6	183.7	177.7	180.0
1958	240.2	246.6	247.3	254.5	251.4	242.3	258.5	249.9	261.9	262.4
1959	248.2	255.0	255.1	264.6	260.3	251.2	268.1	257.4	272.0	273.4
1960	249.9	257.3	257.4	269.8	264.6	252.7	270.1	260.2	275.8	278.9
Jan. 1961	246.8	255.7	255.5	271.8	264.7	249.1	269.0	259.7	276.3	281.9
Boston Area										
1926–29	116.3	120.3	115.4	106.2	107.0	118.8	106.3	112.5	108.7	105.8
1939	106.2	110.4	110.1	116.3	113.7	105.7	114.2	111.5	118.2	118.5
1949	223.0	226.5	225.9	216.7	215.6	227.1	201.3	222.9	218.2	221.9
1958	284.2	294.7	294.8	302.8	294.7	289.0	301.7	294.3	317.0	314.1
1959	291.7	301.9	302.5	313.1	302.9	296.9	312.4	301.9	327.4	326.2
1960	295.7	307.1	306.4	319.8	308.5	300.7	310.0	306.9	330.2	333.1
Jan. 1961	292.5	305.8	304.4	320.6	306.6	297.6	303.5	307.6	327.7	336.8
Chicago Area										
1926–29	109.2	114.2	109.8	113.2	109.1	112.9	105.2	105.9	112.0	116.0
1939	110.6	112.5	111.1	123.6	118.7	114.2	117.6	109.3	122.6	127.5
1949	219.2	218.3	216.1	210.6	208.7	229.1	193.3	207.7	210.4	215.1
1958	284.9	290.1	287.9	304.1	293.1	297.3	294.9	279.7	312.4	316.7
1959	293.6	299.1	298.6	316.0	303.1	306.9	304.4	287.8	323.0	327.1
1960	298.6	305.5	302.7	321.1	307.2	311.7	306.1	295.1	328.5	335.5
Jan. 1961	298.1	305.1	302.1	322.0	306.8	311.0	304.0	295.3	327.6	336.2
Cincinnati Area										
1926–29	100.5	105.0	101.3	101.0	100.2	100.2	99.6	103.1	100.6	101.0
1939	103.3	106.2	105.9	113.9	110.4	103.3	111.7	107.1	113.7	116.5
1949	214.1	216.6	215.8	207.5	206.0	217.9	193.5	214.1	208.4	212.2
1958	273.8	285.9	284.7	296.3	284.9	278.4	290.8	287.9	306.8	309.5
1959	281.0	293.7	292.3	305.8	293.6	285.8	299.4	294.8	316.4	320.5
1960	287.8	300.4	298.2	314.8	300.5	293.6	299.3	301.3	321.5	329.6
Jan. 1961	285.3	299.1	296.5	316.2	299.9	290.8	295.1	300.9	320.6	332.1
Cleveland Area										
1926–29	107.2	113.4	108.5	111.3	108.3	109.0	103.0	107.2	110.5	114.8
1939	106.2	109.6	109.5	115.3	112.8	107.5	112.9	109.5	117.7	118.0
1949	224.8	225.7	223.6	216.0	213.0	233.0	198.5	218.0	217.2	220.9
1958	294.2	306.5	304.5	316.0	301.8	302.3	301.7	305.1	327.0	331.2
1959	303.5	315.6	313.0	325.7	310.5	313.0	301.7	312.5	337.0	341.6
1960	304.3	316.8	313.8	330.9	313.8	314.6	312.1	312.8	340.5	348.2
Jan 1961	298.7	312.3	309.0	330.4	311.7	308.7	307.3	308.9	337.5	348.4
Dallas Area										
1926–29	103.1	107.3	103.2	98.9	99.1	103.6	100.5	100.9	99.4	99.7
1939	95.1	95.8	96.7	98.8	100.2	94.8	106.6	96.0	101.9	98.9
1949	207.2	206.2	206.9	197.1	201.3	210.3	197.1	203.2	201.5	195.4
1958	257.7	264.2	266.0	266.3	265.0	257.7	276.8	268.6	278.0	269.5
1959	265.1	272.1	273.7	275.0	273.3	265.6	282.3	276.9	285.7	278.3
1960	268.4	275.1	275.9	279.7	276.0	269.0	280.2	278.9	286.6	283.4
Jan. 1961	265.9	273.6	273.9	280.3	274.8	267.9	275.4	276.5	283.9	284.2
Denver Area										
1926–29	95.0	99.7	95.5	102.4	99.6	95.5	105.5	94.6	101.4	108.0
1939	112.1	112.0	111.2	116.1	114.4	114.3	118.7	109.5	117.0	117.8
1949	212.9	215.8	215.9	211.0	213.1	216.2	207.0	214.3	214.6	215.3
1958	272.0	282.2	282.3	288.1	283.2	273.5	289.3	286.8	298.8	295.0
1959	278.9	288.7	288.7	295.2	289.8	280.6	293.3	292.6	304.8	302.9
1960	282.7	292.2	291.8	301.3	295.4	285.5	300.5	294.4	310.0	309.0
Jan. 1961	282.5	290.2	289.4	301.0	294.5	285.0	298.0	290.9	308.5	308.1
Detroit Area										
1926–29	103.3	108.4	104.3	102.9	102.4	103.7	103.1	103.5	103.3	104.4
1939	98.8	102.7	102.9	108.6	107.5	98.7	108.8	104.2	111.4	110.1
1949	221.0	222.6	221.9	212.2	211.5	227.0	196.8	216.8	214.2	215.9
1958	291.0	303.2	301.7	312.2	298.5	297.5	299.9	302.9	323.2	326.6
1959	301.4	313.9	312.2	325.6	311.0	309.7	312.8	312.6	338.0	341.4
1960	305.1	318.5	316.3	332.4	316.5	313.9	317.9	317.1	344.3	346.4
Jan. 1961	303.9	317.8	314.9	332.7	315.7	312.0	307.0	316.9	338.8	349.2

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
Kansas City Area										
1926–29	100.3	106.5	102.2	105.7	103.3	101.1	105.9	101.9	107.5	108.8
1939	104.4	109.9	109.8	118.3	115.4	103.8	117.2	113.0	120.0	121.6
1949	215.9	216.7	216.3	209.0	211.1	221.8	199.4	210.0	211.3	211.5
1958	273.9	278.2	277.2	284.8	279.2	283.0	286.7	270.2	294.0	295.2
1959	282.8	286.3	285.0	293.2	287.1	293.0	293.0	277.5	302.0	303.4
1960	287.4	291.6	289.7	299.5	291.9	297.9	295.0	283.0	306.7	310.0
Jan. 1961	285.5	290.7	288.4	300.5	291.7	295.8	291.5	282.6	305.8	311.8
Los Angeles Area										
1926–29	92.7	97.9	93.5	98.8	96.8	93.5	97.0	91.3	97.5	103.1
1939	93.6	97.2	97.5	103.7	105.0	95.6	109.5	96.8	106.2	104.9
1949	203.2	207.0	206.0	209.9	210.7	205.3	201.2	201.8	210.2	212.4
1958	286.6	277.9	276.9	302.6	294.4	276.3	310.8	272.0	316.4	314.5
1959	279.1	288.7	287.2	314.9	305.1	288.1	318.9	281.3	327.6	326.9
1960	287.7	299.8	297.2	329.1	316.3	296.5	327.0	293.1	339.6	342.7
Jan. 1961	284.9	298.2	296.0	332.7	317.8	293.0	328.9	293.6	342.6	347.4
Minneapolis Area										
1926–29	92.8	98.2	94.6	95.6	96.1	92.8	100.0	93.9	97.9	98.4
1939	101.9	105.0	104.2	113.5	110.7	102.7	113.4	103.6	114.5	117.2
1949	218.7	218.7	217.7	205.1	206.9	224.4	192.6	211.7	205.8	208.0
1958	283.6	295.7	295.5	297.6	289.7	286.3	293.0	298.6	310.4	309.9
1959	292.3	304.7	295.9	307.8	299.2	295.7	300.1	306.8	319.8	321.1
1960	296.4	310.4	309.1	315.4	304.4	299.8	298.9	312.6	324.0	330.2
Jan. 1961	296.8	309.9	307.8	315.1	301.2	299.6	292.6	311.7	321.1	330.3
New Orleans Area										
1926–29	93.3	96.3	93.4	86.5	90.6	93.3	93.7	91.5	89.5	86.5
1939	89.0	90.3	91.3	95.4	98.3	88.1	102.8	91.7	98.5	94.9
1949	201.6	201.4	202.0	188.8	194.6	204.9	186.0	200.0	191.8	189.8
1958	251.1	256.7	257.4	258.5	257.9	253.5	261.0	259.1	266.7	263.4
1959	257.8	263.6	264.1	266.9	265.7	260.8	268.4	265.4	275.1	272.8
1960	260.8	267.0	267.4	273.3	270.9	264.1	272.4	269.1	280.5	279.3
Jan. 1961	257.6	264.8	265.2	275.4	271.5	260.0	273.1	268.2	281.9	281.7
New York City Area										
1926–29	133.3	138.4	131.9	122.8	120.4	137.5	113.1	127.4	123.2	125.3
1939	122.1	123.3	122.5	130.6	125.9	125.6	123.7	119.6	130.0	133.3
1949	240.8	243.7	242.7	242.8	238.2	247.5	217.3	238.3	240.0	246.4
1958	315.1	328.0	326.0	348.6	331.3	324.5	329.3	324.0	357.3	365.4
1959	329.0	342.7	340.1	367.7	346.7	339.3	343.1	338.3	374.1	386.8
1960	337.2	351.6	348.8	377.7	355.9	347.2	344.7	347.7	380.6	395.8
Jan. 1961	341.3	357.2	353.4	385.8	360.5	351.5	344.8	353.8	385.1	406.3
Philadelphia Area										
1926–29	100.3	103.3	103.7	105.9	103.1	98.1	101.9	104.2	104.1	107.5
1939	99.2	102.6	102.9	105.7	104.1	98.2	102.0	105.0	105.5	106.7
1949	220.5	220.6	220.3	209.0	209.0	224.3	190.3	216.3	205.6	209.9
1958	286.0	292.6	292.1	299.2	291.8	291.2	287.9	289.6	304.4	307.3
1959	297.6	305.9	305.5	318.2	308.6	304.6	307.2	301.7	327.1	328.5
1960	298.1	306.1	305.3	317.7	307.9	304.7	301.0	303.2	322.8	326.7
Jan. 1961	295.9	305.6	304.2	321.4	309.2	302.7	298.3	303.5	324.0	331.8
Pittsburgh Area										
1926–29	113.3	118.8	112.8	111.2	107.1	115.4	89.6	112.2	104.6	112.9
1939	113.8	117.0	115.7	117.5	114.2	114.2	109.8	116.5	116.9	119.1
1949	227.1	229.1	227.7	215.6	212.2	231.3	186.9	227.0	209.8	219.8
1958	289.7	299.4	298.1	305.5	294.0	295.5	289.8	299.5	311.8	317.6
1959	301.8	311.5	309.7	319.5	307.0	308.4	302.0	310.4	324.7	332.8
1960	308.8	319.1	316.7	329.8	315.9	316.1	305.1	317.4	331.9	343.0
Jan. 1961	310.6	320.9	318.1	334.0	317.8	318.0	304.0	319.3	333.6	347.2
St. Louis Area										
1926–29	118.6	121.1	115.7	109.9	108.8	121.3	103.3	111.7	107.7	109.3
1939	107.0	110.2	109.9	118.7	116.4	107.6	114.3	110.3	119.2	119.8
1949	220.7	221.4	220.7	212.8	212.4	226.8	197.5	217.3	213.6	215.7
1958	287.9	297.0	295.2	304.9	293.4	295.9	295.2	293.8	313.8	318.4
1959	296.4	305.4	303.6	315.0	301.7	305.5	304.9	301.6	323.9	329.8
1960	301.0	311.4	309.2	322.2	308.1	309.8	304.9	308.4	329.2	337.2
Jan. 1961	300.7	313.0	310.4	326.1	310.0	309.5	302.9	311.1	330.7	343.1
San Francisco Area										
1926–29	87.7	93.7	90.4	97.5	96.5	86.1	95.5	91.8	95.9	99.0
1939	99.2	105.7	104.5	117.4	114.4	97.6	114.9	107.4	116.5	121.9
1949	207.1	213.0	212.8	214.0	213.9	210.0	203.9	213.9	216.1	219.8
1958	274.9	289.8	289.0	311.5	299.5	278.9	304.3	292.9	320.8	326.7
1959	284.4	299.2	298.0	322.7	309.3	289.1	311.5	300.9	330.1	338.1
1960	288.9	305.5	303.9	335.3	319.7	294.5	320.9	307.7	342.3	352.2
Jan. 1961	281.7	300.6	298.7	337.0	319.1	286.4	321.6	305.2	343.2	355.2
Seattle Area										
1926–29	84.5	92.2	89.2	101.7	95.1	82.4	100.8	92.2	100.5	105.9
1939	96.7	104.4	103.8	119.2	114.9	94.4	115.1	108.3	118.7	125.3
1949	203.9	214.3	214.0	220.7	218.1	205.2	209.9	218.0	225.3	228.5
1958	256.4	279.9	280.2	306.0	293.2	253.6	302.0	294.4	320.8	324.0
1959	267.8	291.5	291.2	318.8	304.1	265.8	309.0	305.1	331.8	336.9
1960	272.4	298.9	298.4	330.5	313.8	270.0	317.5	313.6	342.9	351.2
Jan. 1961	268.1	296.1	295.1	333.7	314.4	265.7	319.0	312.1	344.9	355.3
Washington, D. C.										
1926–29	106.6	107.7	107.9	107.1	105.9	106.0	104.0	108.0	106.4	108.4
1949	223.1	223.3	223.1	213.5	212.6	227.2	194.8	218.6	210.4	214.6
1958	281.8	286.5	286.5	293.9	288.2	289.1	297.4	281.4	305.7	302.2
1959	289.7	294.7	294.2	303.1	295.9	298.1	303.3	288.1	314.0	312.2
1960	294.2	300.2	299.4	311.1	301.6	302.6	306.5	294.0	319.7	321.7
Jan. 1961	296.2	303.0	301.7	316.5	305.1	305.1	308.7	296.4	324.1	327.8

Six faster ways to drier,
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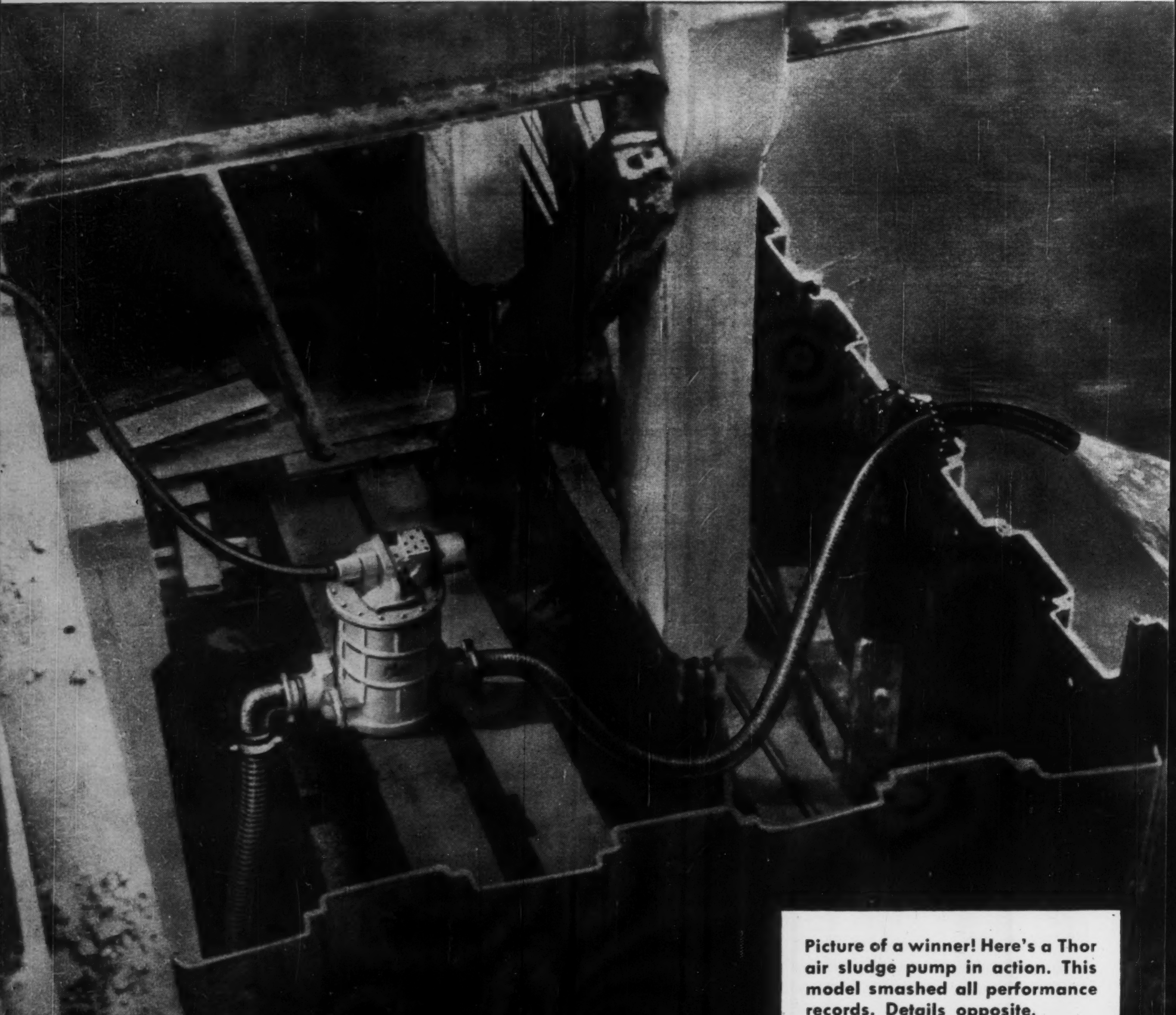
THOR SUMP AND SLUDGE PUMPS

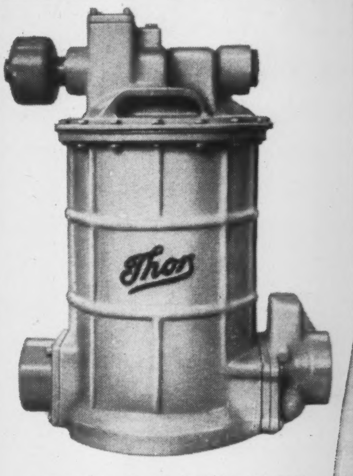


Picture of a winner! Here's a Thor air sludge pump in action. This model smashed all performance records. Details opposite.

Get your water problems under control fast with Thor air sump and sludge pumps—the portable, high performance way to remove excess sludge and water.

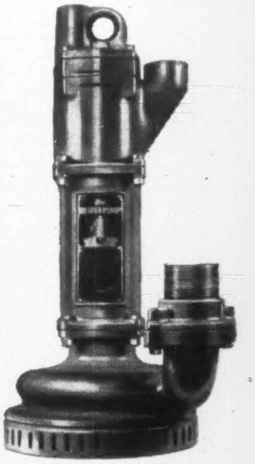
Thor pumps have been proven around the world under the most adverse conditions. Job site proved means better output for you.

Six air-powered models to choose from—one just right for your job. See it in action? Sure. Ask your Thor "Red Tool" distributor. He's listed in the Yellow Pages. Or write us for more on Thor's big line of "Red Tools."



MODEL 275 SLUDGE PUMP

DELIVERS 86 GALLONS PER MINUTE at 65 foot head. Removes water containing up to 15% solids—even clam shells! No motor. Operates on continuous two-stage breathing cycle. Minimum noise. Stainless Steel working parts.



MODEL 381T SUMP PUMP

HIGH HEAD PUMPING TO 185 FEET plus high volume. Rugged and self priming, it operates in dirty water, oil, sewage partially or fully submerged. Model 381T Air Sump Pump.

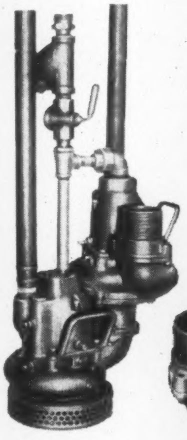
MODEL 51T SUMP PUMP

DELIVERS 200 GALLONS PER MINUTE at 10 ft. head. Built-in exhaust mufflers cut noise 30%. Weight 35¾ lbs. Model 51T Air Sump Pump. Also available in non-spark bronze construction.

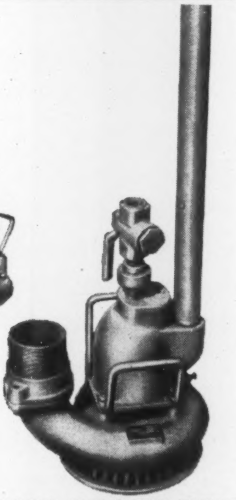
WEIGHS ONLY 18 LBS. All aluminum. Delivers 200 gallons per minute at 10 ft. head. Model 51TA Air Sump Pump. Also available in aluminum-bronze construction.

MODEL 51TA SUMP PUMP

DELIVERS 460 GALLONS PER MINUTE at 10 ft. head, 40 gallons at 120 ft. head. 30% quieter. Weight 60 lbs. Model 71T Air Sump Pump. Non-spark bronze model offered. Also Tandem model (71TT).



MODEL 71TT TANDEM SUMP PUMP



MODEL 71T SUMP PUMP

THOR POWER TOOL COMPANY

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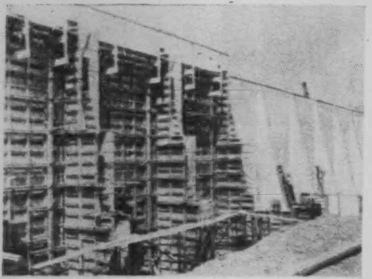

adaptability and flexibility of Simplex-Waco Forms proved on giant shopping center

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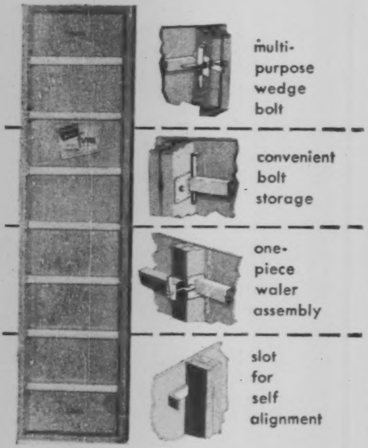

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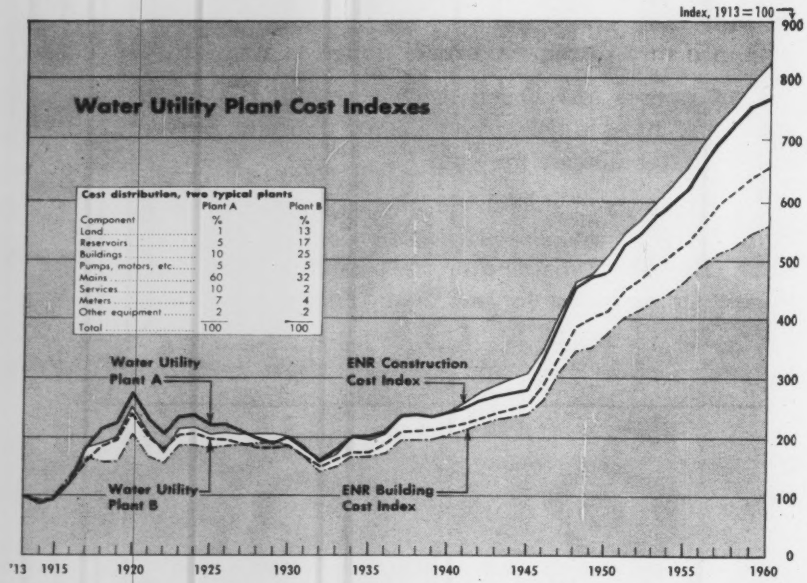
Weber Fick & Wilson Waterworks Index



Cost distribution, two typical plants

Component	Plant A %	Plant B %
Land	1	13
Reservoirs	5	17
Buildings	10	25
Pumps, motors, etc.	5	5
Mains	60	32
Services	10	2
Meters	7	4
Other equipment	2	2
Total	100	100

The two water utility cost indexes shown, A and B, illustrate the effects of historical price changes upon two systems with identical kinds but dissimilar amounts of property.

The basic components of the two systems reflect the approximate dispersion of various classifications of property of two existing Pennsylvania utilities. For simplicity it has been assumed that: 1, all structures are made of brick and concrete; 2, the transmission and distribution systems are composed of cast iron mains; 3, services are constructed of steel pipe; and 4, equipment includes motors, pumps, office, and contractors' items.

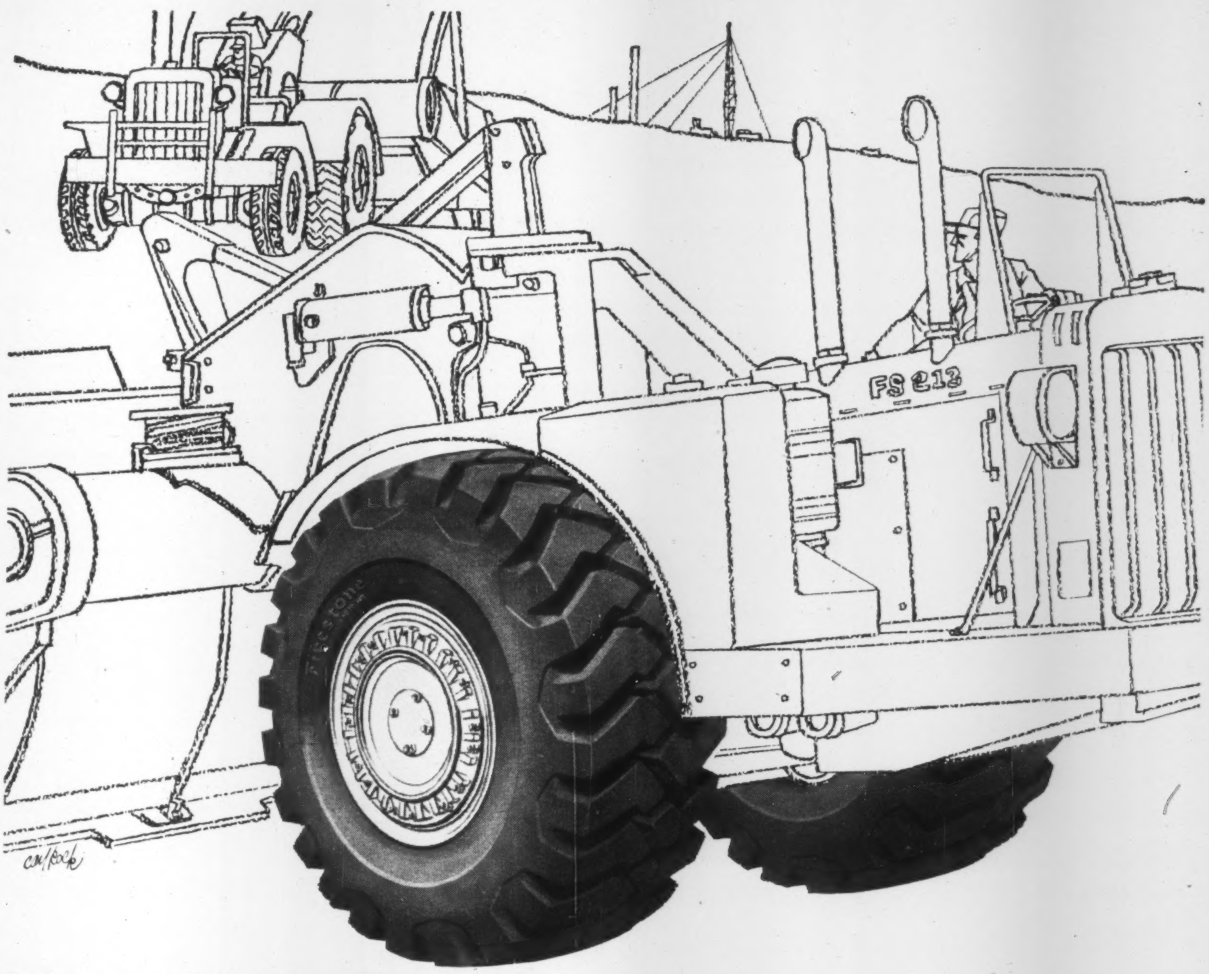
Differences between the plants are indicated by the weightings assigned to each, in the table on the graph. These are applied to the seven components indexes and the land cost is added. The component indexes are developed from the supporting indexes.

Waterworks Property Cost Indexes—1913=100

Henry H. Fick, Weber, Fick & Wilson, Harrisburgh, Pa.

By Type of Plant	1926	1932	1939	1940	1945	1949	1956	1958	1959	1960	Dec. 1960
A, graph table shows weighting	222.0	164.0	235.3	242.0	280.5	463.2	659.0	728.9	751.0	769.3	776.2
B, graph table shows weighting	199.4	152.3	212.7	217.1	256.6	401.9	560.5	615.6	637.7	653.6	659.3
Components Weighted to Get Plant Cost Indexes—Land Costs Added											
Reservoirs, ENR Constr. Cost	208.0	157.0	235.5	242.0	307.7	477.0	692.4	759.2	796.9	823.6	830.6
Buildings, Boeckh, Brick	210.3	161.7	223.9	224.2	278.2	413.2	548.7	596.8	625.6	644.7	652.8
Pumps-Motors, Handy-Whitman	134.2	134.0	147.8	147.0	148.2	232.0	371.0	436.5	448.8	433.8	428.0
Distribution Mains, Composite	241.1	164.9	256.8	266.6	303.1	519.5	735.9	813.6	834.6	855.0	862.8
Services—Steel, Composite	230.9	194.6	243.2	246.8	294.5	470.5	701.0	795.0	831.1	860.3	872.6
Meters, Composite	175.0	168.7	168.8	169.7	207.5	315.6	460.9	484.5	491.5	498.2	500.9
Other Equipment, Composite	147.0	107.1	126.9	129.7	155.9	237.0	303.1	338.1	345.1	349.7	351.9
Supporting Indexes											
BUILDING COST INDEXES											
ENR, Building	185.0	140.9	197.4	202.8	239.1	351.8	490.8	524.7	547.8	559.4	561.5
Boeckh, brk & conc, comm & factory, Pittsburgh, Pa., area	210.3	161.7	223.9	224.2	278.2	413.2	548.7	596.8	625.6	644.7	652.8
ICC RR constr, sta & office bldg., Reg. III (1910–14=100)	185.0	142.0	168.0	177.0	241.0	369.0	486.0	521.0	.....	.....	.....
Handy-Whitman, brk, No Atl Div	229.0	175.3	214.0	218.3	267.0	423.8	578.0	631.8	649.8	660.3	655.0
MATERIALS & EQUIPMENT											
CI Pipe, 6″ & up, Del Riv Foundries	220.9	139.3	212.9	223.1	227.7	415.2	564.2	612.9	612.9	612.9	612.9
Steel Pipe, 3″ & less, pvt	187.5	171.9	155.4	155.4	155.4	249.7	372.3	427.9	438.5	438.5	438.5
Motors, Handy-Whitman, No Atl Div	134.2	134.0	147.8	147.0	148.2	232.0	371.0	436.5	448.8	.....	.....
Equipment, Marshall & Stevens											
Contractors	158.7	114.1	130.8	132.4	162.7	255.7	326.3	371.0	383.5	390.8	394.1
Office	136.8	101.1	123.5	127.2	149.9	220.9	282.6	309.6	311.5	313.8	314.8
Meters, private sources	162.5	162.5	147.7	147.7	177.3	265.9	385.8	395.9	395.9	395.9	395.9
OTHER INDEXES											
Common Labor, ENR 20-cities aver	288.4	224.7	359.5	367.9	478.9	763.2	1,136.8	1,281.6	1,351.6	1,419.5	1,445.8
Construction, ENR Constr. Cost	208.0	157.0	235.5	242.0	307.7	477.0	692.4	759.2	796.9	823.6	830.6
Gas Utility Costs, Handy-Whitman, No Atl Div	212.0	174.5	229.6	235.2	268.5	432.9	621.9	690.7	715.7	731.3	738.0

Tables showing the complete record of these water plant cost indexes by years from 1913 to 1960 are available from Mr. Henry H. Fick, Weber, Fick & Wilson, Public Utility Consultants, 1801 North Front St., Harrisburgh, Pa.



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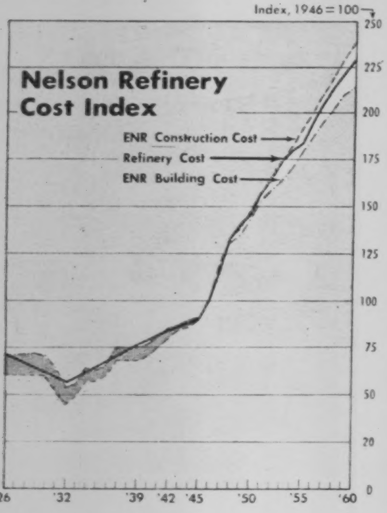
Refinery Costs Rise

Costs Roundup—1st Quarter



Petroleum Refinery Cost Index

Compiled by W. L. Nelson, Petroleum Refinery Engineering Consultant; published by Oil & Gas Journal, Tulsa, Oklahoma—1946=100

	1926	1932	1939	1942	1945	1949	1954	1955	1956	1957	1958	1959	1960	Dec. 1960
NELSON Refinery Construction Index	***72.0**	***56.6**	***76.6**	***83.7**	***89.9**	**139.7**	**179.8**	**184.2**	**195.3**	**205.9**	**213.9**	**222.1**	**228.2**	**229.5**
EQUIPMENT														
Heat exchangers	75.0	60.0	76.0	93.5	91.9	133.0	171.7	156.8	190.7	203.6	181.2	178.9	194.0	186.8
Instrument (control)	....	90.0	89.5	85.5	90.6	122.0	154.6	162.9	182.1	187.4	194.9	201.0	202.5	207.5
Pumps, compressors	....	....	91.5	87.5	93.9	135.9	166.5	172.2	164.0	206.7	214.7	226.5	228.3	228.8
Electrical equipment	81.0	57.0	68.5	74.0	81.8	130.9	160.0	162.5	175.0	188.6	192.7	195.8	195.2	193.1
Internal Combustion engines	....	....	84.5	84.5	91.7	124.8	150.5	153.2	192.0	173.9	178.3	178.5	180.7	180.0
Miscellaneous equipment average	***94.0**	***79.0**	***82.0**	***85.0**	***90.0**	**†121.6**	**160.7**	**161.5**	**180.5**	**192.1**	**192.4**	**196.1**	**200.0**	**199.2**
MATERIALS	....	**68.0**	**82.0**	**86.3**	**89.7**	**143.6**	**174.6**	**176.1**	**190.4**	**201.9**	**204.2**	**207.8**	**207.6**	**206.4**
LABOR	....	**49.0**	**73.0**	**82.0**	**90.0**	**137.1**	**183.3**	**189.6**	**198.2**	**208.6**	**220.4**	**231.6**	**241.9**	**244.9**

* Approximate, projection back to these dates from other cost sources.
† Used to compute Index until Apr 1952. Slightly different from the average of the miscellaneous equipment items shown.

EQUIPMENT PRICES, mainly from manufacturers as quoted to Oil & Gas Journal **MATERIALS COMPONENTS** from Bureau of Labor Statistics Wholesale Price Index, Code 10-1, Iron and Steel and Code 13, Building Materials
LABOR, half skilled and half common labor as quoted by Engineering News-Record. For base costs see ENR Oct. 8, 1953, p 115

The Nelson index applies to the costs of constructing petroleum refinery and process units since 1946, projected back to 1926. It's based on proportions of steel, common building materials, labor and equipment used in refinery construction.

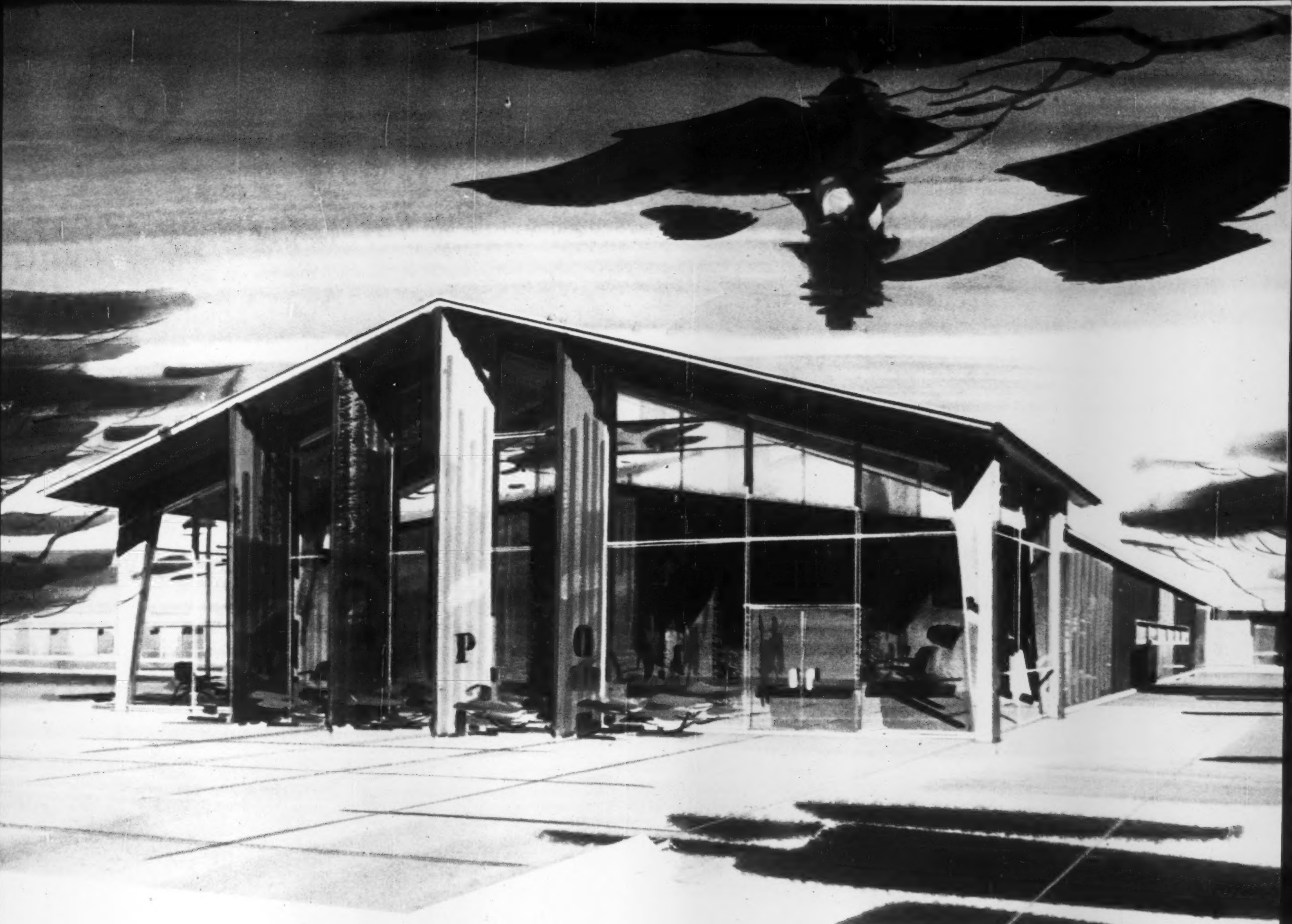
The materials component (40% of the total index) includes two Bureau of Labor Statistics wholesale price indexes—iron and steel and building materials—and a miscellaneous equipment average published monthly by the Oil and Gas Journal. Each of the two BLS price indexes is converted to a 1946 = 100 base. The iron & steel index on the new base is then multiplied by 0.5. The BLS Construction Materials Price Index, on the new base, is multiplied by a factor of 0.2. The miscellaneous equipment price average is multiplied by 0.3. All three materials are then added to determine the materials component.

The labor component is made up of skilled and common labor rates published by ENR. Average common and skilled labor rates are divided by their 1946 average to make two wage indexes based on 1946 as 100. Each of these indexes is then multiplied by a factor of 0.5 and added to make up the labor component of the Nelson index.

Building Equipment Price Indexes, 1947-49=100

US Bureau of Labor Statistics Wholesale (Primary Market) Price Indexes

Item	1951	1952	1953	1954	1955	1956	1957	1958	1959	Jan 1959	Jan 1960	Dec 1960	Chge 1/60 12/60
HEATING EQUIPMENT	**114.6**	**113.8**	**114.8**	**114.3**	**115.0**	**119.0**	**122.1**	**121.2**	**121.7**	**121.8**	**120.9**	**116.8**	**−3.4**
Oil burner	106.2	108.8	108.0	105.9	105.6	109.0	112.2	114.3	114.3	114.3	114.3	114.6	+0.2
Boiler, cast iron, gas-fired	98.9	98.9	105.8	101.7	101.8	106.9	111.7	115.2	117.3	117.3	117.3	114.0	−2.9
cast iron, oil fired	135.3	136.7	144.3	148.1	151.5	159.7	171.4	175.3	181.5	181.5	181.5	181.7	+0.1
steel, oil-fired	124.3	124.3	128.5	130.9	131.2	135.1	141.5	147.5	151.6	151.6	151.6	151.6	0
Radiation, cast iron	124.0	125.8	136.1	140.1	142.5	148.8	157.3	161.0	164.3	164.3	164.3	164.3	0
Convectors, nonferrous metal	106.2	104.4	105.7	101.0	100.9	103.7	103.9	105.7	108.6	109.8	111.0	114.7	+3.3
Warm air furnace, oil-fired	126.4	124.4	126.5	129.1	128.3	132.7	141.1	140.4	140.5	141.3	139.7	136.2	−2.6
gas-fired	112.9	110.9	112.2	113.9	114.4	115.0	108.1	96.2	107.6	98.5	105.6	100.1	−5.3
PLUMBING EQUIPMENT	**122.5**	**117.4**	**116.0**	**118.4**	**125.4**	**133.9**	**130.2**	**123.7**	**130.1**	**124.9**	**134.0**	**130.8**	**−2.4**
Lavatory, enameled iron	133.9	126.8	132.1	135.8	138.6	142.5	142.5	130.3	137.7	131.2	144.9	144.7	−0.2
vitreous china	131.2	124.1	100.3	110.4	112.7	115.9	115.9	117.7	128.6	121.7	136.0	132.1	−2.9
Sink, enameled iron	129.2	122.1	128.7	109.3	112.2	109.4	109.3	100.4	101.7	101.2	106.3	106.2	−0.1
enameled steel	122.4	115.5	109.3	109.3	112.2	109.4	92.0	90.1	89.0	91.1	88.2	85.0	−3.7
Water closet, vitreous china	127.4	121.3	109.3	112.1	120.9	126.9	127.0	114.1	119.4	113.0	126.0	116.1	−7.9
Bathtub, enameled iron	129.5	121.4	123.5	126.1	127.4	129.1	130.0	118.9	125.6	118.8	132.2	132.2	0
enameled steel	122.4	118.5	118.6	118.6	120.2	122.5	117.3	115.8	119.6	118.1	121.3	121.3	0
VENTILATION AND AIR CONDITIONING													
Centrifugal blower, 36-in dia	144.5	138.1	138.3	143.8	149.8	167.8	181.4	188.8	192.4	194.3	192.0	194.9	+1.5
Propeller fan, 24-in to 28-in dia	136.4	135.0	138.3	143.6	147.5	162.6	166.8	164.8	164.8	164.8	164.8	161.8	−1.9
Room air conditioner			....	....	95.1	90.5	87.4	83.8	78.4	79.2	76.3	73.7	−3.5
ELECTRICAL MACHINERY & EQUIPMENT	**121.9**	**120.3**	**123.7**	**126.2**	**128.2**	**138.4**	**149.0**	**152.2**	**154.4**	**152.6**	**156.0**	**152.6**	**−2.2**
Distribution transformer, 15 kva	120.1	120.3	120.9	130.5	130.5	134.3	143.2	136.3	135.1	139.0	133.5	133.0	−0.4
45 or 50 kva	115.4	115.7	122.0	125.5	122.9	126.0	134.4	129.4	137.2	130.2	141.2	134.7	−4.7
Power transformer, 5000 kva	114.9	115.0	121.6	125.1	126.8	146.4	156.0	160.0	159.5	160.0	154.4	140.1	−9.3
Generator, hydraulic turbine driven	130.5	134.3	142.3	145.5	147.9	169.7	182.9	194.0	198.5	198.5	198.5	185.5	−6.6
steam turbine driven	112.2	118.6	125.7	129.7	134.5	160.8	191.9	201.2	203.5	203.5	203.5	203.5	0
COMPRESSORS													
Stationary, electric, 100 hp, w.o. motor	126.8	126.8	132.7	136.5	148.9	170.2	180.8	196.2	212.8	212.8	212.8	214.1	+1.0
125 hp, " "	127.8	127.8	132.9	137.1	138.4	153.5	164.3	177.8	190.4	190.4	190.4	190.4	0
PUMPS													
Turbine, vertical deep well, 750 gpm	96.1	98.3	103.4	107.0	106.4	113.4	120.7	120.9	128.9	127.6	133.8	135.2	+1.0
Centrifugal, sgl stage, dbl suction 2" x 2.5" x 3"	133.2	132.6	136.1	134.9	137.0	156.4	169.7	175.2	182.7	180.6	175.0	177.2	+1.2
Rotary, 50 gpm, 100, lb discharge pressure	112.5	110.9	121.4	126.2	133.6	145.4	154.0	154.2	154.2	154.2	171.0	173.2	+1.2
INDUSTRIAL MATERIAL HANDLING EQUIPMENT	**127.3**	**127.1**	**129.8**	**134.0**	**139.2**	**153.4**	**167.3**	**164.3**	**170.4**	**168.5**	**173.3**	**174.0**	**+0.4**
Conveyor, monorail, 1 ton capacity	127.2	127.2	130.6	132.9	135.7	148.2	157.4	155.5	155.5	154.6	164.9	146.4	−11.3
package, gravity, 18-in width	126.5	125.4	132.6	136.3	140.3	151.0	159.2	162.9	165.4	164.8	165.8	169.6	+2.2
belt, 36-in wide, 300-ft long	126.7	127.1	128.6	127.4	131.6	144.4	156.7	162.8	168.0	166.4	169.4	170.0	+0.3
trolley, 4-in., 1,000-ft long	124.1	124.1	127.7	130.9	131.8	141.9	150.3	153.3	157.5	154.0	160.0	164.7	+3.0
Hoist, electric, lug type, 1 ton capacity	122.8	122.8	123.7	126.5	137.4	164.0	173.7	170.8	165.5	170.9	163.4	163.4	0
ELEVATORS & ESCALATORS													
Elevator, freight, 4,000-lb capacity, elec	114.4	115.1	117.0	119.3	122.1	130.2	140.9	141.3	141.3	140.6	142.1	141.9	+3.0
Escalator, 32-in. wide for 16- to 17-ft rise, elect	109.3	109.3	109.3	110.3	114.2	119.0	125.6	127.6	128.2	128.2	128.2	129.2	+0.7
BULK STORAGE TANKS													
Under 10M gal	126.8	123.4	116.2	112.5	114.9	113.9	146.5	149.6	148.1	147.1	151.1	145.9	−3.5
10M gal	128.3	125.1	121.0	119.6	119.9	134.2	146.1	146.6	145.0	143.9	148.2	142.7	−3.8
CHAIN LINK FENCE	....	....	....	....	**165.5**	**176.4**	**192.3**	**201.3**	**201.3**	**201.3**	**201.3**	**201.3**	**0**



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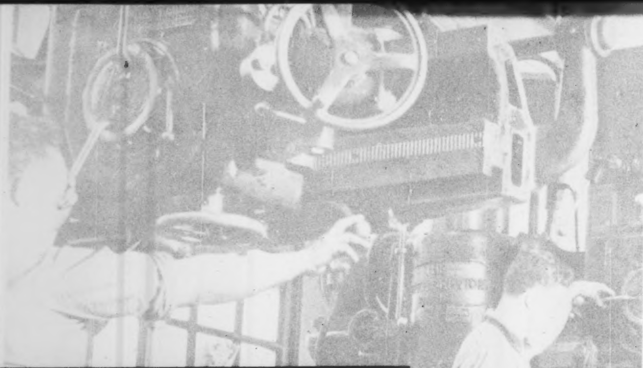
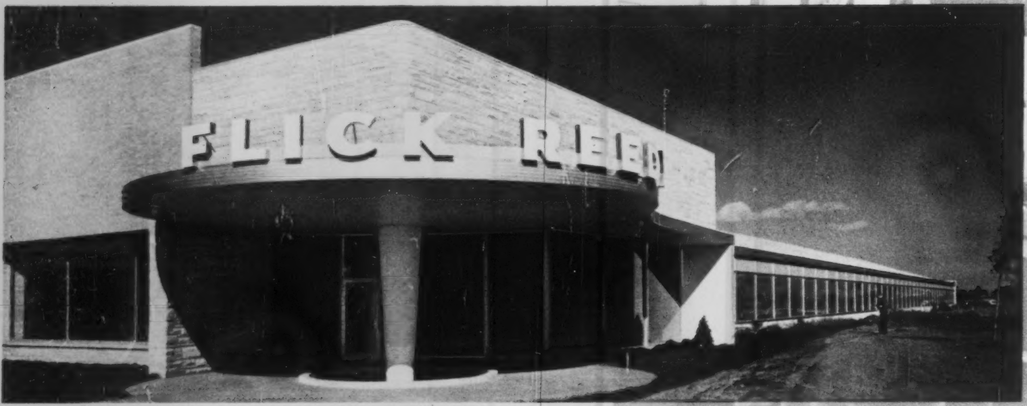
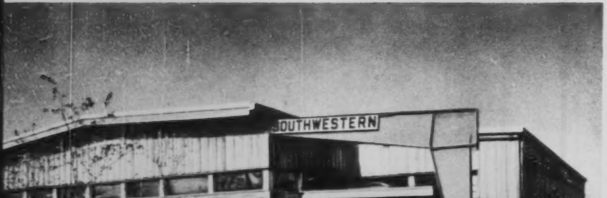




Flick-Reedy Manufacturing Corporation, Bensenville, Illinois, winner of Factory Magazine's 1960 "Plant of the Year" award. ARCHITECT: *Zay Smith & Associates, LaGrange, Ill.,* DESIGNER: *Norman Steenhof.*



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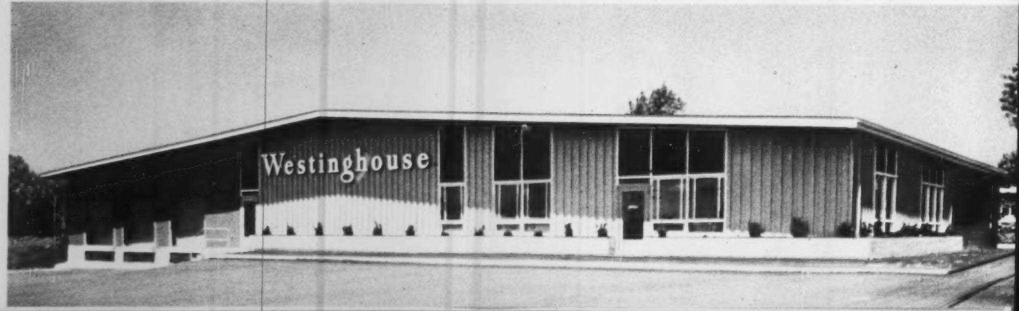
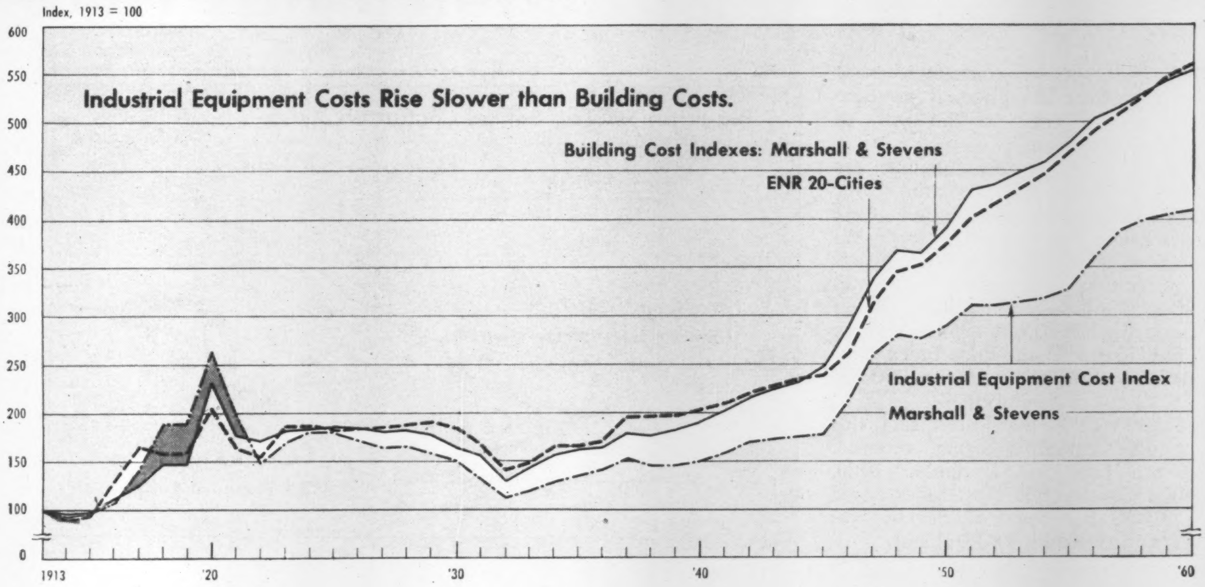


District office for Westinghouse Electric Supply Company, Worcester, Mass., one of six Butler buildings recently completed for The Westinghouse Electric Supply Company throughout the country.



Industrial Equipment: The Spiral Slows

Industrial equipment cost leveled off during 1960, according to Marshall & Stevens indexes. This nationwide appraisal firm's index of installed equipment costs, covering 47 industries, rose only 0.1% to 237.3 (1926 = 100) between December 1959 and December 1960. This razor-thin increase compares with a 2.5% rise during 1959.

Marshall & Stevens equipment cost indexes cover the composite of the entire plant. In computing the indexes, machinery of various kinds, mechanical installation, furniture and fixtures, hand tools and other items are combined in proper proportion to their average occurrence in each plant.

None of the increases in sub-indexes covering various industries came close to the rises seen in '59. Several were on the downside in '60, whereas not one declined in 1959.

Metal working equipment was up 2%, it had jumped up 4% in 1959. Contractors' equipment rose 2% in 1960, compared with 3.7% during 1959. Costs of equipment for aircraft plants, transportation garages and woodworking plants rose about 1% during the past year. Each of these had climbed more than 3% in the December '58-'59 period.

The downside costs for 1960 were equipment for public utilities, food plants, electrical equipment, parts factories, textile plants, and to a lesser degree for laundry, mining and milling, motion picture, printing, shipbuilding, warehousing and logging.

This slight rise in industrial equipment costs fell short of the building cost rise, for the third year in a row. The Marshall & Stevens Industrial Building Cost Index rose 0.7% during 1960 and the ENR 20-cities Building Cost Index registered a 1.6% gain.

The gap between building costs and the cost of industrial equipment has grown steadily over the years. The heavily shaded areas on the chart above mark a brief period when Marshall & Stevens' Industrial Equipment Cost Index moved above their Industrial Building Cost Index. Since that time, the rate of climb in Industrial Equipment Costs has lagged behind the rise in building costs. M&S Equipment Cost Index is now 34.8% under the Industrial Building Cost Index. And it's 36% behind ENR's Building Cost Index.

Industrial Equipment Cost Indexes

Marshall & Stevens, Inc. Los Angeles, Calif., 1926 = 100

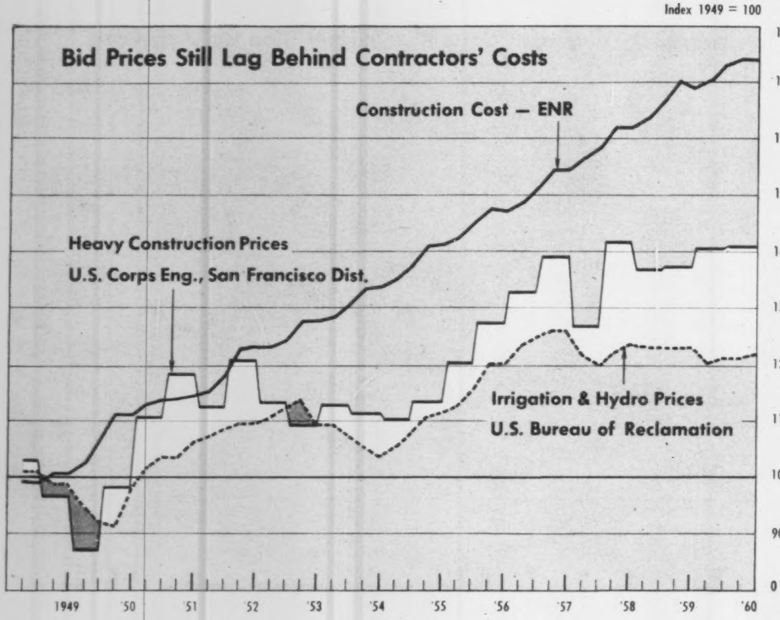
Industry	1913	1929	1932	1939	1940	1945	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	Dec 1959	1960	Dec 1960
Average of All	**57.9**	**91.9**	**66.1**	**84.8**	**86.6**	**103.4**	**150.6**	**162.8**	**161.2**	**167.9**	**180.3**	**180.5**	**182.6**	**184.6**	**190.6**	**208.8**	**225.1**	**229.2**	**234.5**	**237.0**	**237.7**	**237.3**
Commercial (av. of 12*)	58.8	91.8	67.6	86.8	89.8	105.2	146.9	158.6	152.7	159.8	171.8	179.6	174.0	183.3	182.8	195.9	207.8	211.6	213.6	215.2	216.1	216.5
Transportation—garage	69.0	91.5	69.2	83.6	84.9	100.9	157.0	171.1	170.3	179.7	194.6	195.1	197.3	199.0	205.5	227.6	248.6	252.7	260.5	265.1	265.7	267.1
Public utility (av. of 2*)	59.1	91.8	70.1	82.9	84.2	97.5	145.8	159.6	159.7	164.8	176.1	176.6	178.9	181.7	186.8	204.0	221.1	225.3	230.9	233.0	232.9	231.4
Process (av. of 9*)	59.1	90.5	73.2	83.6	84.4	103.8	149.1	161.9	161.1	166.6	178.1	178.5	180.2	183.4	188.7	206.4	223.6	228.5	232.4	236.1	236.8	236.3
Food (av. of 10*)	57.8	92.6	68.5	84.9	86.3	104.1	156.8	169.7	169.2	177.1	189.7	199.2	192.3	194.8	200.7	220.8	239.4	244.0	249.4	252.8	253.4	252.5
Metal working	57.1	92.3	67.9	83.6	88.6	110.7	151.3	161.8	161.8	166.9	178.0	178.6	180.7	184.1	189.3	206.8	224.4	228.7	234.7	239.5	242.4	244.3
Aircraft		93.0	66.7	85.0	88.1	109.8	162.9	178.3	177.5	186.1	201.0	201.7	204.1	205.8	213.4	236.7	257.8	262.8	269.9	274.1	276.0	276.4
Mach & parts, elec eq	59.2	92.0	68.0	83.4	85.4	106.8	156.6	167.4	167.7	175.0	188.6	189.2	191.1	194.6	200.2	218.7	237.5	242.2	248.4	251.8	252.1	250.9
Textile	61.1	91.1	67.8	83.7	84.7	101.8	146.6	157.4	157.3	165.9	192.1	193.3	199.9	199.8	206.6	228.9	247.8	252.2	258.1	261.4	261.7	260.4
Woodworking	56.6	92.0	67.2	83.6	84.6	100.9	149.6	160.4	160.4	165.5	176.6	177.1	178.9	182.3	187.5	204.7	221.8	225.8	231.6	235.5	236.5	236.0
General (av. of 7*)	59.2	95.5	68.8	84.6	86.1	103.2	149.7	162.0	161.8	168.2	180.4	180.8	182.5	185.0	190.7	209.4	226.5	230.4	235.5	238.9	239.1	238.3
Cold storage—refrig	59.3	92.0	70.0	82.1	83.1	101.7	163.2	176.6	175.8	185.2	200.1	200.7	203.1	204.8	211.6	234.3	254.2	258.6	263.9	267.3	268.2	268.0
Contractors' equipment	63.0	91.0	71.9	82.4	83.4	102.5	150.3	161.1	161.1	166.2	177.3	177.8	179.6	183.0	188.2	205.6	224.4	233.7	238.8	243.3	246.2	248.3

* In each of these groups, **MARSHALL AND STEVENS** reports separate comparative equipment cost trends for: **COMMERCIAL**: Apartment, church, hotel, bank, library, restaurant, school, store, theater, hospital, dwelling, office

GENERAL: Laundry, mining and milling, motion picture, printing, shipbuilding, warehouses, logging
PROCESS: Distillery, cement, chemical, glass, petroleum industry, paint, paper, rubber clay products

PUBLIC UTILITY: Steam power, electric power
FOOD: Bakery, bottling, brewery, candy, cannery-fish, cannery-fruit, creamery-dairy, flour-cereal-feed, packing-fruit, packing-meat

Heavy Construction Bid Prices



The gulf between contractors' basic costs and their bid prices is nowhere more evident than in the field of heavy construction.

In the past decade, inflation has tacked 57% onto construction costs, ENR's 20-cities Construction Cost Index shows. Yet contractors' bid prices on heavy construction projects let in western states during the second half of 1960 were only 43% higher than in the last half of 1950, according to the Contract Unit Price Index computed by the San Francisco District, U. S. Corps of Engineers.

There are no indications that this long-term trend is being reversed. Between June and December 1960, ENR's Construction Cost Index edged up 0.5%. But the Corps' index was only a microscopic 0.02% higher.

Compared with the second half of 1959, bid prices for roadway excavation work were up 18%. But structural excavation prices were 13% lower. Structural concrete prices rose 11%. A 33.3% gain was seen in concrete paving bids. And cover aggregate prices were 12.7% higher in the final quarter of 1960. But bid prices for plant mix asphalt skidded 27.3% and plant mix aggregate prices were 8.8% lower. Crushed rock base course prices were 11.2% lower in second-half '60 than a year earlier and bid prices for watering work were down 13.8%.

A look at the U. S. Bureau of Reclamation's Composite Construction Cost Index also illustrates the distance contractors' prices are lagging behind their basic costs. While this is not a "bid price" index, it measures the cost of irrigation and hydro power projects to the construction buyer. So it's a barometer of what contractors' prices for these jobs are. Compared to a 57% rise in the ENR Construction Cost Index between January 1951 and January '61, the Burec index is up only 20%. And between January, 1960 and January '61, when ENR's index rose 2.8%, the Burec index actually declined 0.8%.

All this makes heavy construction one of the greatest "bargains" available in todays economy. But it's rough on the contractor. There is a limit to the amount of cost-price imbalance which can be offset by the construction industry's increasing productivity.

Western States Unit Price Indexes

Estimates Section, San Francisco District, Corps of Engineers, 1st Half 1946 = 100

		1949	1957	1958	1959		1960	
		1st half	1st half	1st half	1st half	2nd half	1st half	2nd half
Index. 1st Half '46 = 100		**132.2**	**170.37**	**163.07**	**176.18**	**176.58**	**180.32**	**180.35**
Items used in index	**Unit**			**Based on these average unit prices**				
Cr rock base course	ton	2.29	3.41	3.65	3.35	3.03	2.42	2.69
Plant mix aggregate	ton	4.43	6.92	7.28	6.97	7.84	7.27	7.15
Plant mix asphalt	ton	26.85	21.50	25.19	21.00	26.00	24.10	18.91
Cover aggregate	ton	5.65	7.13	7.02	6.84	6.95	7.60	7.83
Structural concrete	cy	65.07	82.00	79.00	82.00	82.00	89.00	91.00
Pavement concrete	cy	19.69	23.00	20.00	22.00	24.00	31.00	32.00
Reinforcing steel	cwt	12.70	17.00	17.90	16.00	16.00	14.00	14.00
Cement	bbl	4.98	5.11	5.00	4.83	4.87	4.78	4.92
CM pipe 12"	lf	3.03	4.48	4.33	4.30	4.59	4.45	4.50
CM pipe 24"	lf	5.26	8.04	7.56	7.97	8.08	7.77	8.08
RC pipe 18"	lf	4.27	6.24	6.38	6.71	6.87	6.46	6.33
RC pipe 36"	lf	10.47	13.75	12.72	14.52	14.61	13.46	14.30
VC pipe 6"	lf	2.39	3.70	3.31	3.67	3.63	3.58	3.73
VC pipe 8"	lf	2.80	3.67	4.01	4.65	4.46	4.01	3.92
Sewer manhole	1/10 ea	20.80	28.20	27.40	29.40	27.70	28.90	29.10
Roadway excavation	cy	0.96	1.05	1.09	2.11	97	1.12	1.15
Structural excavation	cy	4.27	5.42	3.78	4.16	4.62	4.04	4.02
Watering	Mgal	2.13	1.92	1.86	1.85	1.95	1.78	1.68
Flat wheel roller	R-hr	7.82	10.06	11.31	11.00	14.21	10.98	11.88
Piling, green wood.f	lf	0.65	0.895	1.09	1.00	93	1.03	1.03
Piling, treated.f	lf	1.45	2.75	1.77	2.16	2.07	2.14	2.02
Timber in place	100 fbm	26.33	50.50	39.30	59.80	52.70	54.30	52.60
2" Galv steel pipe	lf	1.38	1.62	1.67	1.40	1.56	1.80	1.77
Cast-iron pipe 6"	lf	4.17	5.42	5.40	5.05	5.59	5.26	6.50
Cast-iron pipe 8"	lf	6.47	6.07	6.27	6.03	5.93	6.74	6.75
Gate valve 6"	1/10 ea	9.70	10.08	11.50	12.40	10.80	11.20	11.40
Total in dollars		**256.01**	**329.93**	**315.79**	**341.18**	**341.96**	**349.19**	**349.26**

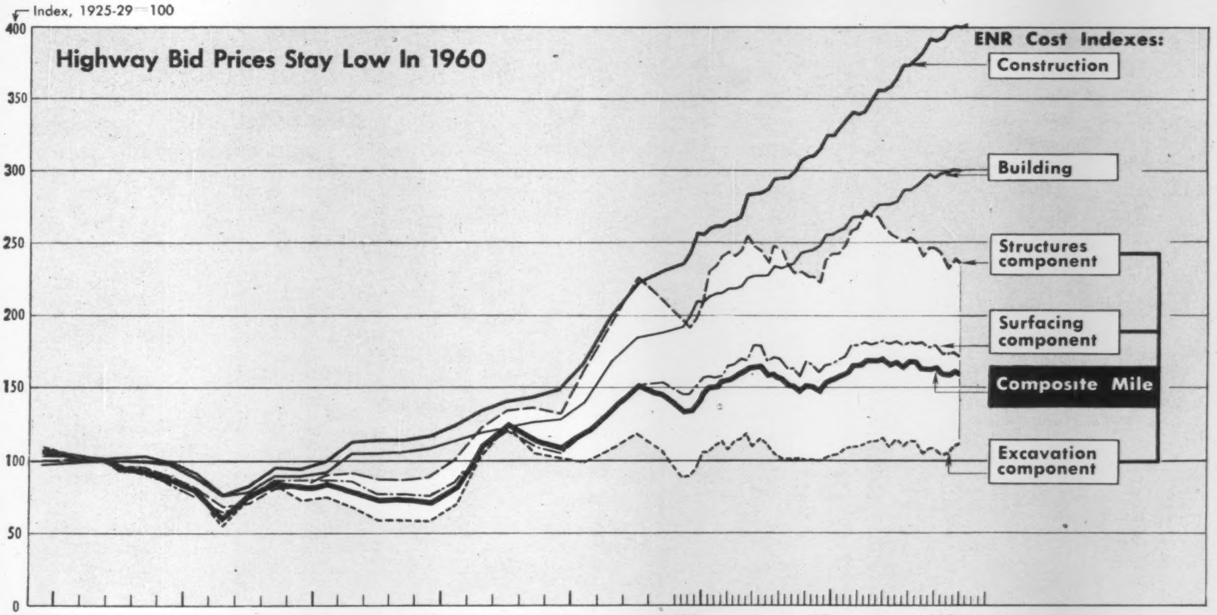
Irrigation and Hydro Cost Indexes

U.S. Bureau of Reclamation, Denver, Colo., 1949-51 = 1.0

	January					1960		1961
Class of Construction	**1940**	**1949**	**1957**	**1958**	**1959**	**Jan.**	**Oct.**	**Jan.**
Composite Index	**0.47**	**1.04**	**1.27**	**1.30**	**1.28**	**1.27**	**1.25**	**1.26**
Dams, earth	0.50	1.12	1.15	1.23	1.12	1.13	1.07	1.09
Dam structure	....	....	....	....	....	0.99	0.91	0.93
Spillway						1.28	1.23	1.24
Outlet works						1.36	1.35	1.36
Dams, concrete	0.47	1.00	1.11	1.16	1.13	1.14	1.12	1.12
Dams, diversion		....	....	....	....	1.39	1.39	1.39
Pumping plants, building & equip	0.48	1.02	1.43	1.46	1.47	1.48	1.44	1.44
Structure, rein conc, & improv	0.43	1.06	1.31	1.36	1.33	1.34	1.29	1.29
Equipment	0.55	0.98	1.56	1.58	1.65	1.70	1.68	1.67
Pumps & prime equipment	....	0.94	1.64	1.66	1.73	1.78	1.76	1.74
Accessory e'ec & misc equip		1.05	1.41	1.44	1.50	1.55	1.55	1.55
Steel penstocks, discharge pipes	....	1.10	1.66	1.72	1.72	1.77	1.78	1.78
Canals	0.46	1.08	1.18	1.19	1.13	1.11	1.11	1.11
Earthwork	....	....	....	....	....	1.06	1.06	1.07
Structures	....	....	....	....	....	1.16	1.16	1.16
Conduits (tunnels, conc-lined)	....	1.02	1.24	1.30	1.29	1.26	1.26	1.27
Laterals & drains	0.41	1.02	1.26	1.32	1.32	1.28	1.30	1.31
Earthwork	....	....	....	....	....	0.97	0.98	0.98
Structures	....	....	....	....	....	1.46	1.46	1.50
Power plants, hydro, bldg & equip	0.50	1.01	1.44	1.48	1.51	1.52	1.50	1.50
Structure, rein conc & improv	0.44	1.05	1.30	1.36	1.34	1.34	1.30	1.30
Equipment	0.55	0.96	1.53	1.54	1.61	1.65	1.63	1.62
Turbines & generators	0.56	0.97	1.57	1.58	1.64	1.68	1.65	1.65
Accessory electrical equip	0.54	1.01	1.44	1.48	1.52	1.56	1.55	1.50
Miscellaneous equipment	0.51	1.05	1.43	1.40	1.44	1.49	1.50	1.50
Concrete pipe lines	....	....	1.27	1.29	1.33	1.36	1.36	1.36
Switchyards & substations	0.54	0.99	1.59	1.60	1.61	1.65	1.60	1.58
Transmission lines—								
Wood-pole, 115-kv	0.50	1.24	1.09	1.16	1.23	1.25	1.26	1.27
Poles and fixtures	....	....	....	....	....	1.12	1.10	1.10
Overhead conductors, devices	....	....	....	....	....	1.35	1.39	1.40
Steel-tower, 230 kv	....	....	1.37	1.43	1.44	1.46	1.48	1.48
Primary roads	0.48	1.06	1.19	1.24	1.24	1.25	1.23	1.24
Secondary roads (unsurfaced)	0.50	1.14	1.13	1.19	1.19	1.18	1.15	1.18
Bridges, steel	0.46	1.06	1.47	1.52	1.48	1.48	1.48	1.49
General property—buildings	0.44	0.95	1.30	1.30	1.35	1.40	1.40	1.40

Based on combined costs of material and labor furnished by the contractor, and the government on US bureau of Reclamation projects in 18 western states including Alaska

Lag Behind Costs



For the third straight year, bid prices declined on federal-aid highway projects let in all states, according to the U.S. Bureau of Public Roads Composite Mile Index.

Between 1957 and 1960, the annual average of the Composite Mile has dropped 5.5%. During this period, contractors' basic costs, measured by ENR's 20-cities Construction Cost Index moved up 13.8%.

The Composite Mile skidded to a four-year low of 159.1 in the second quarter of 1960. It recovered to 162.6 in the third quarter but cracked to 160.7 by December '60, 2.3% below the fourth quarter of 1959. The Composite Mile index is based on average highway bid prices in 1925-29 as 100.

Structural and reinforcing steel bid prices have shown the most dramatic declines. Prices for structural steel work slipped 7.7% from the fourth quarter of 1959. Compared with 1957, the '60 average of these prices is down a whopping 20%.

Reinforcing steel prices slumped 6.7% in the past twelve months. Compared with 1957, these prices averaged 11% lower in 1960. Excavation prices in the fourth quarter of 1960 were 5.3% higher than a year earlier. But their 1960 average trails '57 by 5%. Surfacing prices dropped 3.8% in 1960. Their yearly average has come down 3.5% in the past three years. Structural concrete bid prices slipped 0.7% from the final quarter of 1959. But their 1960 average is 2% lower than in '59 and 3.5% lower than in 1957.

Bid price indexes computed by 10 state highway departments offer some evidence that highway contractors are having a measure of success in matching rising costs with more realistic prices. But when you look at the long-term trend of these indexes, the price-cost gap is as starkly evident as in the picture presented by the BPR Composite Mile. Six out of these ten indexes averaged higher in 1960 than in '59. These are the indexes reported by Idaho, Michigan, Nevada, New York, Oregon and Washington. But compared with their averages three years earlier, seven of the ten were lower. And while bid prices in Michigan, Oregon and Texas averaged higher in 1960 than in 1957, the rate of increase in these states didn't even come close to the jump in basic construction costs recorded by ENR's Index.

Higher contractor productivity can account for only a portion of the downtrend in highway bid prices.

Highway Price Indexes in 10 States and the U.S.

U.S. Bureau of Public Roads Prices & Indexes, 1925-29 = 100 — ENR

	Excavation ¹		Surfacing ²		Structures				Composite Mile Index	ENR Construction Cost Index b
	Price	Index	Price	Index	Reinf. Steel Price	Struct. Steel Price	Struct. concr. Price	Combined Index		
	$0.35	100.0	$2.22	100.0	$0.052	$0.067	$22.15	100.0	100.0	100.0
1957 Av	0.40	113.5	4.02	181.3	0.137	0.218	56.92	267.0	170.0	349.8
1958 Av	0.39	112.5	4.02	181.1	0.130	0.193	54.92	253.3	167.5	366.8
1959 Av	0.38	109.1	3.99	179.9	0.127	0.184	53.42	246.5	164.6	385.07
Q1	0.40	113.4	4.02	181.3	0.128	0.187	54.93	251.2	167.6	377.55c
Q2	0.37	104.8	4.03	181.7	0.125	0.182	51.90	240.7	163.1	383.84c
Q3	0.38	108.6	3.94	177.6	0.126	0.183	54.05	247.1	163.4	392.25c
Q4	0.38	109.4	3.97	179.0	0.130	0.184	52.80	246.9	164.4	390.36c
1960 Av	0.38	108.1	3.88	174.9	0.122	0.174	52.15	238.3	160.6	397.95
Q1	0.36	103.7	3.89	175.4	0.124	0.182	52.75	242.6	159.9	392.97c
Q2	0.37	105.7	3.89	175.4	0.122	0.170	50.30	233.1	159.1	399.51c
Q3	0.39	110.3	3.92	176.7	0.121	0.175	53.11	240.4	162.6	401.51c
Q4	0.40	112.5	3.82	172.2	0.120	0.168	52.43	237.1	160.7	401.36c

State Highway Indexes

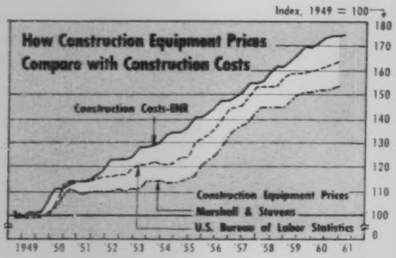
Base Year = 100	California 1940	Colorado 1949	Idaho 1950	Michigan 1940	Nevada 1955	New York 1940	Oregon 1940	South Dakota 1940	Texas '49-'53	Washington 1940
1957 Av	264.3	97.3	116.1	173.0	124.3	268.5	189.3	205.6	108.2	226.4
1958 Av	236.5a	96.1	96.4	171.4a	113.3	257.2a	178.8	184.5	115.9a	211.1a
1959 Av	244.0	93.0	93.6	163.7	104.6	230.3	172.2	200.7	111.0	194.0
Q1	216.1	97.2	108.9	163.0	110.0	246.7	201.4	216.9	117.0	189.0
Q2	270.4	92.5	88.4	164.1	102.4	226.8	165.4	194.1	112.1	194.6
Q3	260.3	89.3	77.5	163.8	105.7	229.6	165.4	215.5	108.4	196.9
Q4	229.1	93.0	99.6	163.2	106.2	217.9	172.8	191.2	106.5	195.4
1960 Av	232.2a	90.3	111.7a	175.1	112.4	237.3	175.4	196.4	110.4	212.0
Q1	219.8	88.1	103.8	170.8	101.2	246.3	167.3	208.2	110.9	192.8
Q2	251.6	92.8	103.6	174.5	111.0	244.3	182.7	195.8	106.0	190.1
Q3	229.1	92.3	102.7	183.8	115.6	226.3	176.4	247.5	114.6	210.7
Q4	228.5	89.3	136.8	171.1	93.5	242.2	175.5	207.3	111.5	212.0

Weightings used in BPR Composite Mile Index are: excavation, 17,491 cy (other than common excavation expressed as equivalent of common); surfacing, 3,726 sy (other than Portland cement concrete expressed as equivalent of Portland cement concrete); reinforcing steel, 16,000 lb; structural steel, 4,325 lb; structural concrete, 68 cy • aAverage of quarterly indexes computed by ENR •b Converted to 1925-29 = 100 base •c Last month of quarter

A Look at the 4'M's

Costs Roundup—1st Quarter

Machines



Construction equipment makers had heavy going in the sales department during 1960, but you'd never know it from their list prices. The U. S. Bureau of Labor Statistics indexes of manufacturers' list prices registered nine consecutive advances during 1960 for a total 1960 increase of 2.3%, twice the increase in the index during 1959. The uptrend is still rolling. On February 15 the latest index available stood at an all time high of 177.8 (1947-49 as 100).

Construction Equipment Price Indexes

U.S. Bureau of Labor Statistics—1947-49=100

	Dec. 15 1960	1959	1958	% Change (Dec. to Dec.) '59-'60
All Types of Equipment	177.0	172.9	170.3	+2.3
Cranes, Draglines, Shovel	172.9	170.5	168.3	+1.4
Shovel, ½ cy	169.3	165.0	156.2	+2.6
Shovel, ¾ cy	175.4	173.9	173.3	+0.9
Shovel, 1-1½ cy	189.3	184.3	180.7	+2.7
Shovel, 2-2½ cy	169.1	164.7	158.8	+2.7
Shovel 3-3½ cy	159.8	167.8	165.2	−4.7
Shovel, 6 cy	197.9	195.0	184.1	+1.5
Crane, truck mounted	168.2	166.2	168.8	+1.2
Crane, tractor mounted	135.1	135.1	135.1	0
Bucket, clam shell	162.9	157.5	155.1	+3.4
Bucket, dragline	169.3	169.3	189.7	0
Scrapers and Graders	166.6	165.8	159.6	+0.5
Scraper,				
4-wheel, 8-10.5 cy	155.0	155.0	155.0	0
4-wheel, 12-15 cy	156.8	156.8	154.4	0
2-wheel, 15-19.5 cy (a)	126.2	124.9	126.2	+1.0
Grader, heavy duty	174.1	172.6	164.2	+0.9
Grader, light medium	170.9	171.1	161.2	−0.2
Tractors (non-farm)	195.3	188.7	187.3	+3.5
Wheel-type, off-hwy (a)	129.2	129.0	129.9	+1.5
Crawler under 49 dhp	200.4	193.6	188.8	+3.5
50-74 dhp	205.3	193.6	191.9	+3.5
75-99 dhp	204.3	197.2	196.4	+3.6
100-154 dhp	199.2	192.4	191.3	+3.5
155-200 dhp	208.6	201.3	201.3	+3.6
Machinery, Tractor Mtd.	176.7	169.0	168.2	+4.6
Dozer, cable control	164.8	154.4	154.4	+6.7
Dozer, hydraulic control	201.9	186.6	186.6	+8.2
Cable power control unit	152.9	151.4	150.0	+0.9
Loader, shovel type	164.6	162.5	161.0	+1.3
Specialized Machinery	158.8	156.2	152.3	+1.7
Ditcher	153.8	150.1	156.6	+2.5
Roller, tandem	226.4	220.2	198.6	+2.8
Roller, 3 wheels	178.7	174.9	162.5	+2.2
Ripper and rooter	164.5	150.5	143.3	+9.3
Dewaterg pump, 10 Mgph	111.5	110.3	112.0	+1.1
Dewaterg pump, 90 Mgph	151.5	151.0	145.7	+0.3
Portable Air Compressors	167.5	167.5	159.5	0
Capacity, under 200 cfm	173.2	173.2	164.9	0
Capacity, over 200 cfm	162.4	162.4	154.6	0
Contractors Air Tools	181.6	181.6	175.9	0
Mixers, Pavers, Spreaders	157.0	157.5	151.4	−0.4
Mixer, portable, 11 cf	166.6	166.8	163.2	+0.2
Mixer, portable, 16 cf	172.7	172.7	166.5	0
Mixer, truck, 6 cy	131.9	132.7	129.1	−0.6
Mixer, Paving, 34 cf	196.8	193.5	188.6	+1.1
Concrete finisher, & spdr	173.5	196.7	183.5	−11.8
Bituminous distributor	126.2	122.3	122.3	+3.1
Bituminous spreader	179.4	170.2	160.3	+5.4
Bituminous paver	165.6	163.2	155.8	+1.5
Off-Highway Vehicles (b)	102.5	101.1	100.6	+1.3
truck (b)	102.0	101.1	100.6	+0.9
Trailer dump wagon (b)	106.7	101.4	101.4	+5.2

(a) January 1955=100 (b) January 1958=100

Material

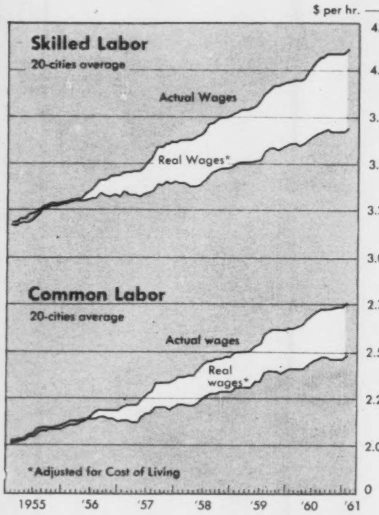
With a couple of exceptions, prices of major construction materials were stable or on the downside in the first quarter of 1961. Structural steel mill prices were unchanged but prices of structural shapes moved higher in seven of ENR's 20-cities. Reinforcing bar prices were unchanged, as were cement prices.

Hydrated lime prices registered the widest move in the first quarter, a 3.8% drop. Clay sewer pipe prices slipped 3.3% and brick prices averaged 2.4% lower in ENR's 20-cities.

Down an average of 1% or less in the first quarter were prices of mineral wool insulation, sand, Douglas fir and southern pine lumber, ready-mixed concrete and concrete blocks. Gypsum sheathing prices edged up 0.2% but fiber board sheathing was unchanged. Plywood sheathing prices cracked 2.4% but prices of plywood for concrete form work advanced about 2%.

The bitter winter which held up construction activity in many areas bears some of the credit for the easiness in materials prices. In the spring months ahead, look for moderate price increases to reflect a pickup in construction.

Men



Union's won't be able to claim that increases received in 1960 were nullified by rising living costs. Common laborers' "real" wage boosts averaged 2.8% last year. "Real" increases for the skilled trades averaged 3%. These increases more than kept pace with a 1.6% rise in living costs.

Money

The cost of long-term borrowing for construction dipped in the first quarter as the Federal Reserve Board stepped into the market for intermediate-term government bonds. This buying trimmed yields on governments, and lowered yields on prime industrials and municipals. A continuation of this policy by the Federal Reserve could make it possible for construction projects to be financed at lower interest cost during this quarter.

Borrowing Cost Trends

Long-Term Bonds*

Year	US Treas. %	Municipal %	Industrial %	Public Utility %	Railroad %
	(Per cent yield to maturity)				
1929	3.60	4.27	5.04	4.96	4.67
1931	3.34	4.01	4.79	4.57	4.42
1939	2.41	2.76	2.64	2.83	3.39
1945	2.34	1.67	2.50	2.59	2.75
1946	2.19	1.64	2.44	2.50	2.59
1949	2.28	2.21	2.53	2.69	2.71
1957	3.47	3.60	3.80	3.99	3.94
1958	3.23	3.56	3.65	3.86	3.89
1959	4.10	3.95	4.25	4.49	4.41
1960 Aver	**3.99**	**3.73**	**4.26**	**4.51**	**4.46**
Mar	4.11	3.87	4.34	4.51	4.55
Apr	4.17	3.84	4.28	4.50	4.55
May	4.15	3.85	4.29	4.54	4.54
Jun	3.93	3.78	4.30	4.55	4.47
Jul	3.78	3.72	4.25	4.48	4.44
Aug	3.71	3.53	4.10	4.37	4.34
Sep	3.72	3.53	4.09	4.35	4.29
Oct	3.85	3.59	4.15	4.43	4.32
Nov	3.88	3.46	4.18	4.48	4.35
Dec	3.87	3.45	4.23	4.52	4.37
1961: Jan	3.87	3.44	4.16	4.47	4.35
Feb	3.78	3.33	4.12	4.40	4.31

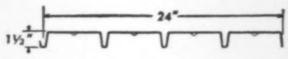
Short-Term Business Loans#

Year	New York City %	7 Other Northern & Eastern Cities %	11 Southern & Western Cities %
1929	5.76	5.82	5.93
1931	3.82	4.26	4.90
1939	2.15	3.05	3.62
1945	2.20	2.55	2.80
1946	1.84	2.51	2.97
1949	2.35	2.86	3.17
1957	4.23	4.39	4.65
1958	4.12	4.34	4.67
1959	4.84	5.01	5.23
1960	4.97	5.15	5.45
1958: Mar	4.29	4.49	4.77
Jun	3.88	4.17	4.58
Sep	4.00	4.21	4.54
Dec	4.29	4.50	4.79
1959: Mar	4.29	4.49	4.84
Jun	4.71	4.90	5.07
Sep	5.15	5.27	5.44
Dec	5.19	5.39	5.56
1960: Mar	5.18	5.34	5.57
Jun	5.19	5.34	5.58
Sep	4.74	4.96	5.32
Dec	4.77	4.97	5.33

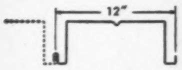
*** Standard & Poor's data: Taxable Treasury bonds (Federal Reserve Bd. series on partially tax exempt bonds shown for years 1929-39 had 1945 value of 1.66%); high grade municipal bonds; A1+ grade industrial, utility and railroad bonds.**

# Federal Reserve Board data for June. New Series 1949 to date; two former series cover up to 1938 and 1939-48 and are not strictly comparable.

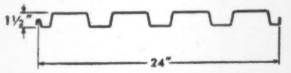
When it comes to roof systems, INLAND covers everything!



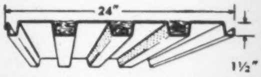
A-DECK — For purlin spacings not exceeding 8′4″. Narrow ribs provide deck surface that supports the thinnest or softest type of insulation.



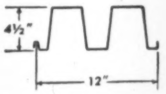
H-DECK — New! For simple spans from 10′0″ to 20′0″ — 3 and 4½″ depths. Especially practical to cover walkways in shopping centers, schools, other installations.



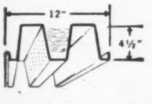
B-DECK — For spans to 10′0″. Wide rib distributes metal for greater structural efficiency — gives higher section properties per pound of steel — well suited for use as side wall panels.



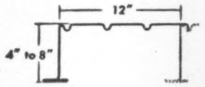
B-ACOUSTIDECK — Two-in-one panel combines steel roof deck with acoustical ceiling having Noise-Reduction Coefficient of .70 — used for spans to 10′0″.



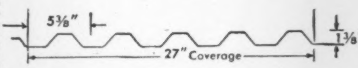
C-DECK—Carries normal roof loads over spans up to 24′0″. Used extensively in canopies.



C-ACOUSTIDECK — Offers same Noise-Reduction Coefficient as B-Acoustideck. Can be used for spans to 24′0″.



T-STEEL — New! Galvanized only — for clear spans to 32′0″. Adaptable to acoustical and flush, luminous ceiling treatments. Provides superior diaphragm to transmit seismic and wind loads.



RIBFORM — High tensile galvanized steel form for concrete slabs over spans up to 8′0″. Three types: Standard, Heavy-Duty, Super-Duty.

◆ Whether your design calls for a dry insulation board roof or for wet-fill, there's an Inland roof system for the job — by the makers of famous Milcor steel building products.

Inland steel deck weighs less than half as much as poured-in-place or pre-cast construction. You can space joists wider and use lighter framework, to save both time and money. Panels are easy to handle and weld in place — in any weather that a man can work.

Types A, B, C, and H decks have the additional advantage of a Bonderized, baked-enamel prime finish that resists on-the-job damage. One field coat of paint on these Inland decks usually covers.

Write for catalogs 240, 241, and 245 — or see Sweet's sections 2c/Inl, 11a/In, and 2a/In.

member of the INLAND® steel family

ENGINEERED PRODUCTS DIVISION

INLAND STEEL
PRODUCTS COMPANY
Dept. C, 4147 West Burnham Street
Milwaukee 1, Wisconsin

EP-1A

ATLANTA, BALTIMORE, BUFFALO, CHICAGO, CINCINNATI, CLEVELAND, DALLAS, DENVER, DETROIT, KANSAS CITY, LOS ANGELES, MILWAUKEE, MINNEAPOLIS, NEW ORLEANS, NEW YORK, ST. LOUIS

CIRCLE 79 ON READER SERVICE CARD

B.F.GOODRICH TIRES MOVE ROCK FILL FOR COUGAR DAM.

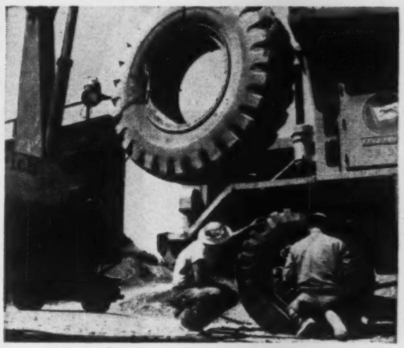
Finished dam will tower 485 feet, stretch 1,600 feet, and slope from a base width of 1,500 feet to a crest width of 40 feet.

Six-mile reservoir will provide water resources for flood control, power production and public recreation. $50-million project is scheduled to take four years.

30 TONS OF ROCK CRASH onto B.F. Goodrich Rock Service tires. Tires work two shifts a day on scrapers, bottom dumps, rear dumps, water wagons, graders, rollers and mobile cranes. Yet it's not unusual for tires to be retreaded twice.

CONTINUOUS TIRE INSPECTIONS play a key role in keeping M-C&S' equipment on the go. The B.F.Goodrich Unified Contractors Program helps contractors save on all their rubber products—and protective clothing—requirements. Ask your BFG dealer to show you how this new program can help *you.*

B. F. Goodrich helps move a mountain to build a dam



B.F.GOODRICH ON-THE-SPOT SERVICE helps M-C&S get the most out of equipment. Tire changes seldom take longer than 15 minutes. BFG Servicemobiles carry all the latest power tools, are manned by tire experts.

12-MILLION CUBIC YARDS OF ROCK AND EARTH FILL RIDE TO $50-MILLION COUGAR DAM PROJECT ON B.F.GOODRICH TIRES

They're changing the topography of Oregon's Willamette Valley. Rock quarried from a knob high above the South Fork McKenzie River is taxied down a tortuous road by a fleet of giant earth movers. It will become part of the fill for Cougar Dam, a Corps of Engineers flood control project that will be the largest structure of its type in the Northwest.

Altogether, general contractor Merritt-Chapman & Scott Corp. will move 12-million cubic yards—every one on B.F.Goodrich tires. You'll find B.F.Goodrich Rock Service tires with Cut Protected compound hard at work here. BFG developed this compound for jobs like Cougar Dam, where upwards of 30-ton loads must be carried over hard, rock-surfaced roads. It takes a mighty big boulder to gash this compound, and if it should, there's BFG Flex-Rite Nylon cord construction to withstand the impact (and resist heat blowouts and flex breaks too). No wonder many Rock Service tires at Cougar Dam can be retreaded twice.

B.F.Goodrich on-the-job service plays a key role in keeping M-C&S equipment on the go. All 600 BFG tires are inspected regularly. Tire changes seldom take longer than 15 minutes. There is a BFG tire warehouse and shop less than a mile from the project. A BFG tire record system keeps the contractor informed of costs and helps control inventory.

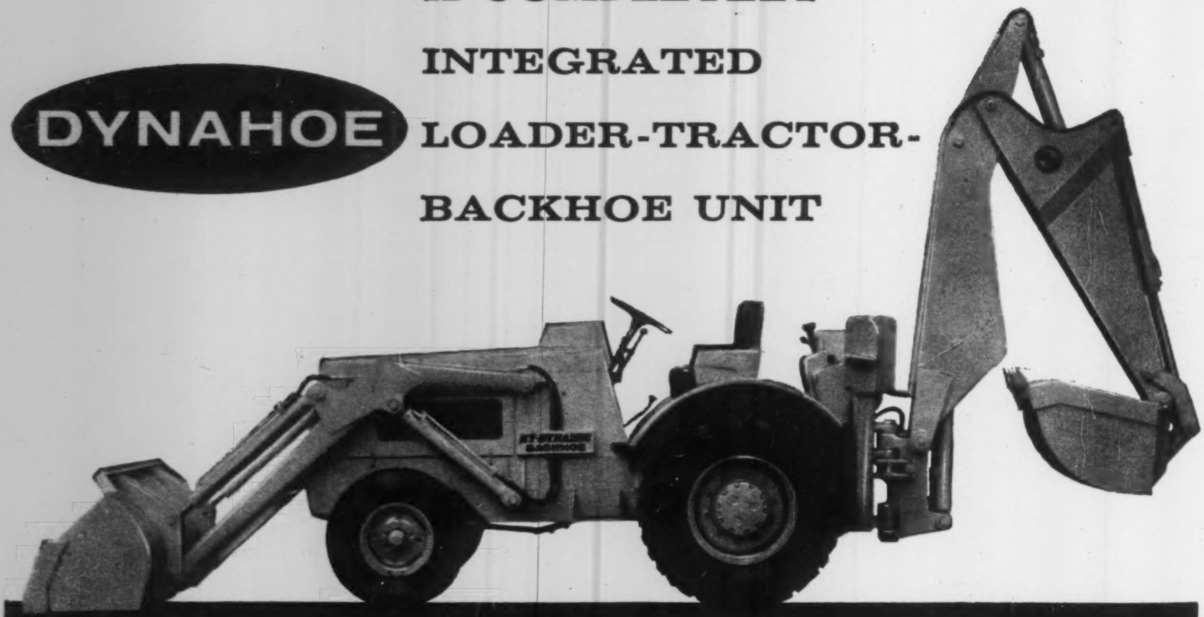
Supplying contractors with longer-wearing tires and dollar-saving service is an everyday job for B.F.Goodrich. On many projects B.F.Goodrich supplies everything from tires to boots to belts through its new Unified Contractors Program. Whatever *your* need, it will pay you to talk to your B.F.Goodrich dealer. His know-how can make a big difference in your profit picture. Look him up under Tires in the Yellow Pages. *The B.F.Goodrich Company, Akron 18, Ohio.*

Specify **B.F.Goodrich Tubeless or tube-type tires when ordering new equipment**

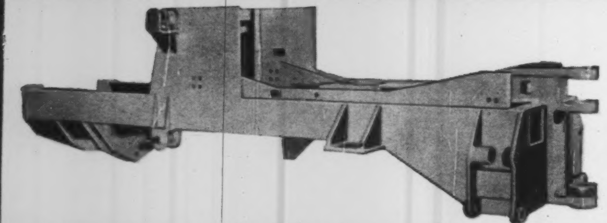
CIRCLE 81 ON READER SERVICE CARD

B.F.Goodrich

A COMPLETELY INTEGRATED **DYNAHOE** LOADER-TRACTOR-BACKHOE UNIT



A NEW CONCEPT IN MACHINE DESIGN . . .



Massive Foundation Frame. Only this design can provide the stamina and strength so vital to successful heavy duty Backhoe performance.

Designed and Built by men with many years of experience

SPECIAL EXCLUSIVE FEATURES

Unit Construction: The complete Loader-Tractor-Backhoe is built as ONE INTEGRATED UNIT. . . differing completely from machines consisting of a standard tractor to which loader and backhoe attachments have been added.

New Operating Advantages: Extremely easy to handle . . . unusual visibility for both backhoe and loader operations. Operator's seat quickly pivots to either loader or backhoe controls. Either 4 or 6 handle backhoe controls.

Extremely Heavy-Duty Construction: All major component parts, such as frame, buckets, booms, dipper, etc., are exceedingly heavy duty.

Good Traction: Maximum tire flotation is provided in BOTH front and rear axles.

Oversize Pins and Bushings: . . . for greatest strength and wear . . . Zerk fitting lubricated.

Fast Swinging and Digging: Adequate hydraulic power guarantees especially fast backhoe boom swinging and digging action.

Loader Bucket: ⅞ yd. struck.

Backhoe Bucket: 7.8 cu. ft. std. Digs 14 ft. deep.

Adequate Cooling: Oversize radiator, fan and hydraulic oil coolers prevent overheating of oil or water under all conditions.

Exclusive Design: The only machine engineered as a single, completely integrated Loader-Tractor-Backhoe unit.

Power Steering: Easier to drive on the road and to operate in the field. Adequate weight on steering wheels for 18 to 20 m.p.h. highway travel.

Transmission: 3 speed with torque converter and power shift forward and reverse provides easier, faster operation for all backfilling and loading jobs.

Buckets: . . . are of extra heavy construction. Bucket teeth with replaceable caps on Backhoe.

Weight Distribution: The unit has proper weight distribution on both rear and steering axles to provide the best flotation, operating and best highway driving characteristics.

Heavy Planetary Rear Axle.

65 H.P. 6 Cyl. Engine.

For further information and the name of our nearest distributor, phone or write:

DYNAHOE

MANUFACTURED BY
THE HY-DYNAMIC CO.
419 SKOKIE HIGHWAY, LAKE BLUFF, ILLINOIS
CEdar 4-5400

Materials Prices Monthly Market Quotations by ENR Field Reporters

LUMBER, TIMBER, PLYWOOD—*Southern Pine*, bold face, *Douglas Fir*, italic

Item	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
LUMBER, TIMBER																							
1x6s4s	Mbf.	**80.00**	**90.00**	**90.00**	**98.00b**	**108.00**	**101.00**	**103.00**	**95.00**	....	**102.00**	**105.00**	....	**110.00**	**89.00**	**95.00b**	**105.00**	**107.00**	**111.00**	....	....	**83.00**	**84.00**
		....	*110.00*	*85.00*	*102.00*	*105.00*	*101.50*	....	....	....	*90.00*	*105.00*	*90.00*	*100.00*	*109.00*	....	....	*103.00*	....	*70.00*	*57.00*	*160.00*	....
1x8s4s	"	**82.00**	**95.00**	**92.00**	**103.00b**	**111.00**	**103.00**	**105.00**	**99.00**	....	**104.00**	**105.00**	....	**110.00**	**89.00**	**100.00b**	**105.00**	**107.00**	**113.00**	....	....	**89.00**	**88.00**
		....	*110.00*	*85.00*	*106.00*	*107.00*	*103.50*	....	....	....	*92.00*	*105.00*	*90.00*	*100.00*	*99.00*	....	....	*105.00*	....	*70.00*	*60.00*	*160.00*	....
2x4s4s	"	**90.00**	**90.00**	**89.00**	**104.00b**	**105.00**	**101.75**	**107.00**	**100.00**	....	**98.00**	**100.00**	....	....	**90.00**	**115.00b**	**95.00**	**95.00**	**121.00**	....	....	**83.00**	**80.00**
		100.00	*120.00*	*88.00*	*115.00*	*119.00*	*112.00*	*123.00*	....	*108.00*	*95.00*	*105.00*	*92.00*	*120.00*	*105.00*	*120.00*	*117.00*	*115.00*	*124.00*	*83.00*	*70.00*	*160.00*	*100.00*
2x6s4s	"	**85.00**	**90.00**	**91.00**	**104.00b**	**119.00**	**102.00**	**103.00**	**103.00**	....	**98.00**	**105.00**	....	....	**95.00**	**115.00b**	**105.00**	**100.00**	**121.00**	....	....	**83.00**	**79.00**
		90.00	*120.00*	*86.00*	*115.00*	*118.00*	*112.50*	*115.00*	....	*108.00*	*95.00*	*110.00*	*92.00*	*120.00*	*105.00*	*122.50*	*120.00*	*115.00*	*124.00*	*83.00*	*70.00*	*160.00*	*100.00*
2x8s4s	"	**85.00**	**90.00**	**96.00**	**104.00b**	**128.00**	**107.50**	**107.00**	**103.00**	....	**108.00**	....	....	....	**95.00**	**115.00b**	**110.00**	**100.00**	**121.00**	....	....	**99.00**	**83.00**
		85.00	*120.00*	*86.00*	*115.00*	*118.00*	*114.50*	*120.00*	....	*108.00*	*104.50*	....	*92.00*	*120.00*	*105.00*	*122.50*	*120.00*	*115.00*	*124.00*	*83.00*	*70.00*	*160.00*	*103.00*
2x10s4s	"	**90.00**	**95.00**	**102.00**	**122.00b**	**128.00**	**112.00**	**115.00**	**106.00**	....	**112.00**	**115.00**	....	....	**98.00**	**115.00b**	**110.00**	**105.00**	**120.00**	....	....	**125.00**	**82.00**
		90.00	*120.00*	*103.00*	*126.00*	*120.00*	*118.00*	*123.00*	....	*112.00*	*112.00*	*115.00*	*92.00*	*120.00*	*107.50*	*125.00*	*125.00*	*115.00*	*124.00*	*83.00*	*71.00*	*160.00*	*104.00*
3x12Rgh	"	....	**110.00**	**121.00**	....	**123.00**	**122.50**	....	**135.00**	....	....	....	....	....	**126.00**	....	**125.00**	**115.00**	....	....	....	....	**95.00**
		....	*140.00*	*93.00*	*150.00*	*128.00*	*144.00*	*150.00*	....	*177.00*	*175.00*	*135.00*	*130.00*	*165.00*	*116.00*	*169.00*	*142.50*	*120.00*	*178.00*	*91.00*	*84.50*	*168.00*	*118.00*
6x12Rgh	"	....	**160.00**	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
		....	*170.00*	*90.00*	*152.00*	*128.00*	*144.00*	*150.00*	....	*197.00*	*175.00*	*180.00*	*140.00*	*165.00*	*116.00*	*169.00*	*210.00*	*120.00*	*178.00*	*112.00*	*89.50*	*170.00*	*118.00*
12x12Rgh	"	....	**120.00**	**178.00**	....	**151.00**	**155.00**	....	**160.00**	....	....	....	....	....	**155.00**	....	....	....	....	....	....	**120.00**	....
		....	*150.00*	*98.00*	*169.00*	*128.00*	*144.00*	*150.00*	....	*197.00*	*175.00*	*180.00*	*140.00*	*165.00*	*113.00*	*169.00*	*210.00*	*125.00*	*178.00*	*114.00*	*89.50*	....	*120.00*
FIR PLYWOOD (a)																							
5/8" Int. Plyscored, CD gr.	Msf.	....	120.00	118.30	112.00	114.00	111.20	117.00	114.50	113.50	114.45	113.25	94.75	108.00	114.00	114.20	113.00	112.75	112.37	92.00	89.50	....	143.60
3/4" Exterior Plyform, BB gr.	"	....	190.00	195.50	194.80	198.00	189.65	192.00	185.05	184.00	191.70	193.00	142.50	191.05	192.00	198.60	197.50	196.00	192.93	168.00	172.00	....	210.85

Fir-Random length, 75% construction grade, 25% standard grade, 30,000 bf delivered, green stock, grademarked. Pine-Random length, #2 common and better, Southern Pine Inspection Bureau grademarked, 30,000 bf delivered. •a Certificated stock, carlots, fob city •b Hemlock, 75% construction grade, 25% standard grade. •c Kiln-dried stock.

WINDOW GLASS, Discounts from Jobber's list, Feb. 1, 1960 (a) sales tax extra—single or double strength

	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
A quality	78%	74%b	82%c	72+10%eg	72%	74%	74-2-10%	76%	73.5%	72-10-10%	76-10-10%	$12.88/17.32	71-10%	76%d	79%	80%	72%	72-10-10%ef	60%	$8.85/11.55di	40-10-5%a	$6.49/9.57
B quality	80%d	74%b	82%c	72+10%eg	72%	74%	74-2-10%	76%	73.5%	72-10-10%	76-10-10%	$10.45/14.13	71-10%	76%d	79%	80%	72%	72-10-10%ef	73%	6.41/8.67di	40-10-5%a	5.90/8.70

Glass: •a Jobber's list price per box, 14 x 20, ss. $42.75 for A quality, $37.50 for B quality; 14 x 20, ds. $60.00 for A quality, $52.75 for B quality. •b sales tax extra. •c 77% for single strength. •d From 6/15/52 list. •e 77% for double strength. •f Single strength; double strength, 83%. •g From 8/1/58 list. •h ss/ds, 40-in. •i 20 boxes min. •l eff. 10/15/58. •m less 2% disc, 10 days. •n less 1% disc, 10 days. •o add 2% sales tax. •p less 1% for cash. •q less 2% for cash.

EXPLOSIVES per lb, 40% Ammonia Gelatin in 50 lb cases delivered in 500 lb lots (non-seismograph grades)

Urban Areas	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
	$0.2595	$0.2795	$0.2595	$0.2795	$0.2795	$0.2595	$0.2595	$0.2870	$0.2795	$0.2795	$0.2795	$0.2795	$0.2795	$0.2795	$0.5130g	$0.2795	$0.2595	$0.2795	$0.2795	$0.2795	$23.20h	....

Explosives: Cartridges of 1¼" diameter or over, in standard lengths. •g deliveries in certain areas must be by truck or by truck and boat, requiring extra charge. •h fob Beloeil (near Montreal), per 100 lb., lots under 2000#, wood cases, forcite, 40%. Forcite 60%. $24.30 in fiber cases; forcite 40%, $24.05; forcite 60%, $25.80. Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Non-Urban Areas	C/L 300,000 lb. lots	10,000 lb. lots	2,000 lb. lots	200 lb. lots
Group 1*	$0.2095	$0.2195	$0.2545	$0.2695
Group 2†	.2170	.2270	.2620	.2770

*All areas except those in Group 2 and N.J. cities of Bayonne, Hoboken, Jersey City, No. Bergen, Union City and Weehawken † Florida counties of Manatee, Hardee, Highlands, Okeechobee, St. Lucie and south thereof; Idaho; Maine; Montana; New Mexico counties of Catron, Socorro, Lincoln, De Baca, Roosevelt and south thereof; Texas counties of Bailey, Lamb, Hale, Floyd, Motley, Cottle, Hardeman, Foard, Knox, Haskell, Jones, Taylor, Coleman, McCulloch, San Saba, Burnet, Williamson, Milan Robertson, Leon, Houston, Angelina, Nacogdoches, Shelby and south thereof.

PILES prices per linear foot, fob cars, New York

Dimensions	Points	Length	By Rail— Pine*§	Fir	Dimensions	Points	Length	By Rail— Pine*§	Fir
12" at butt	6-in.	30 to 39-ft.	$0.42a	....	14"—2-ft. from butt	6-in.	65 to 69-ft.	1.21	....
12"—2-ft. from butt	6-in.	40 to 44-ft.	.91	....	14"—2.ft. from butt	6-in.	70 to 74-ft.	1.34	$1.40
12"—2-ft. from butt	6-in.	45 to 49-ft.	.97	....	14"—2-ft. from butt	6-in.	75 to 79-ft.	1.41	1.40
12"—2-ft. from butt	6-in.	50 to 54-ft.	1.01	....	14"—2-ft. from butt	5-in.	80 to 84-ft.	1.54	1.45
12"—2-ft. from butt	6-in.	55 to 59-ft.	1.07	....	14"—2-ft. from butt	5-in.	85 to 89-ft.	1.67	1.54

* Pine piling over 90 feet available only in limited quantities. § ASTM Class B •a, trucked in from N. J. Prices per linear foot, fir and pine, rough peeled, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine under fifty feet based on freight from mid/South, over fifty feet, on freight from deep south.

RAILWAY TIES

Prices f.o.b. per tie box carload lots:		6" x 8" x 8' Untr.	6" x 8" x 8' Tr.	7" x 8" x 8'6" Untr.	7" x 8" x 8'6" Tr.
Birmingham*	Hardwood, Grade 3	$1.70	$2.55	Gr. 5 $2.25	$3.33
	Grade 2	1.50	2.35	" 4 2.10	3.18
	Grade 1	1.15	2.00	" 3a 1.70	2.78
Chicago	Red Oak	2.85-3.00	4.00a-4.10	3.90	4.75-5.00
New York	Mixed Hardwood	3.45	5.10	4.30	6.50
	Mixed Oak	3.55	5.20	4.40	6.60
Philadelphia	Mixed Oak	3.80	3.97	4.37	4.57
St. Louis	Mixed Oak	2.65	3.50a	3.00h	4.00-4.10ah
San Francisco	Douglas Fir	2.05ef	3.30ef	2.40ef	3.35ca

Tr.—Treated; Untr.—Untreated. •a Creosoted. •c Empty cell. •e Green •f f.o.b. cars. •g 7 x 9 x 8'6" * Add 75¢/tie freight charge to Birmingham. •h 7" x 9" x 8½. •l Mixed Hardwood

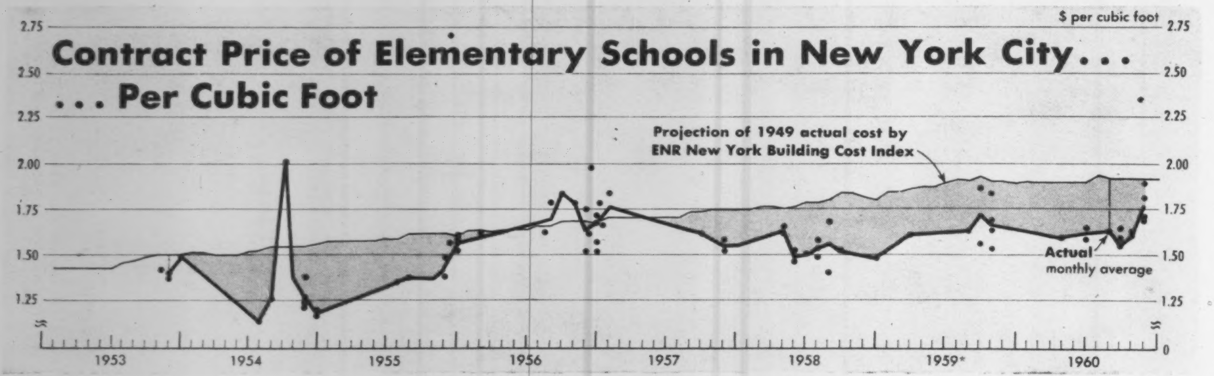
CHEMICALS Water, sewage treatment, road work, carlots, f.o.b. works

Chlorine cylinders, liquid, per lb. freight allowed, N. Y. State	$ .11	Soda ash, 58%, in paper bags, per 100 lb. dense	1.90
Calcium chloride, 77-80%, flaked, 100-lb. paper bag, ton	32.00	Sulphate of aluminum, commercial, in 100-lb. bags	2.05
Silicate of soda, 52 deg., in drums, per 100 lb.	2.65	Sulphate of copper in bags, 99% per 100 lb., reg., 25.2% copper content	13.00

See following ENR issues for OTHER PRICES:

- Clay Products, Lime, Plaster, Paint, Roofing: Last, Mar. 2; Next, Mar. 30.
- Wage Rates, Building Board, Lath, Insulation: Last, Mar. 2; Next, Mar. 30.
- Cement Aggregate. Ready-Mixed Concrete: Asphalt; Last, Mar. 9; Next, Apr. 6.
- Iron & Steel Products, Pipe: Last, Mar. 16; Next, Apr. 13.

School Costs Mixed in New York City



Contract Price of Elementary Schools in New York City... ... Per Cubic Foot

Unit Prices of Schools Built in New York City—by Years

Bureau of Design and Construction, Board of Education, City of New York

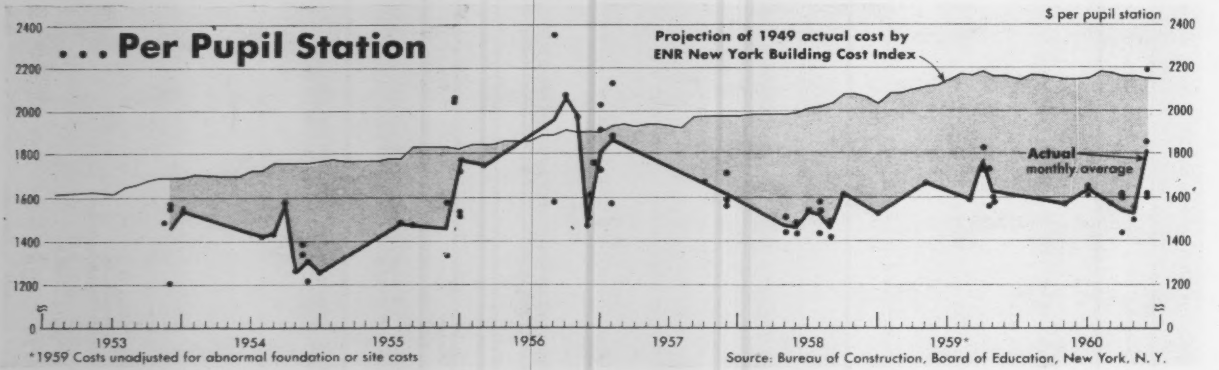
Elementary Schools

	no.	per cu ft min	per cu ft aver	per cu ft max	per pupil sta min	per pupil sta aver	per pupil sta max	capacity pupil stas min	capacity pupil stas aver	capacity pupil stas max
1947	(9)	$1.16	$1.25	$1.56	$1,255	$1,517	$1,991	558	1,162	1,550
1948	(5)	1.20	1.30	1.43	1,399	1,581	1,784	806	1,094	1,433
1949	(12)	1.03	1.18	1.40	1,148	1,334	1,638	868	1,181	1,588
1950	(11)	1.04	1.20	1.55	957	1,357	1,612	302	1,036	1,581
1951	(24)	1.11	1.39	1.69	1,447	1,710	2,451	358	885	1,274
1952	(9)	1.23	1.40	1.72	1,391	1,518	1,689	494	969	1,310
1953	(6)	1.37	1.41	1.49	1,202	1,488	1,570	792	944	1,238
1954	(9)	1.14	1.33	2.01	1,216	1,354	1,580	302	1,073	1,292
1955	(10)	1.35	1.61	2.71	1,338	1,653	2,059	133	1,117	1,364
1956	(12)	1.52	1.69	1.97	1,467	1,811	2,361	842	1,244	1,631
1957	(7)	1.52	1.74	2.20	1,564	1,731	2,136	487	1,134	1,400
1958	(12)	1.42	1.54	1.69	1,419	1,501	1,608	1,265	1,336	1,651
1959	(8)	1.53	1.67	1.87	1,560	1,673	1,824	1,220	1,280	1,323
1960	(14)	1.55	1.65	1.90	1,442	1,643	2,185	1,091	1,307	1,393

Junior High Schools

	no	per cu ft min	per cu ft aver	per cu ft max	per pupil sta min	per pupil sta aver	per pupil sta max	capacity, pupil stas min	capacity, pupil stas aver	capacity, pupil stas max
1947	(2)	$1.21	$1.23	$1.25	$1,270	$1,277	$1,284	1,810	2,068	2,326
1948	(1)	1.32	1.32	1.32	1,623	1,623	1,623	1,518	1,518	1,518
1949	(3)	0.99	1.09	1.26	1,261	1,380	1,553	1,518	1,819	1,998
1950	(1)	1.07	1.07	1.07	1,210	1,210	1,210	2,012	2,012	2,012
1951	(5)	1.32	1.36	1.38	1,408	1,511	1,645	1,558	1,842	2,020
1952	(7)	1.10	1.22	1.31	1,187	1,342	1,451	1,732	1,813	2,056
1953	(7)	1.10	1.22	1.29	1,176	1,280	1,462	1,766	1,968	2,185
1954	(6)	1.10	1.23	1.30	1,237	1,322	1,517	1,694	1,969	2,136
1955	(11)	1.25	1.44	1.63	1,370	1,580	1,904	1,772	1,950	2,114
1956	(6)	1.49	1.64	2.02	1,580	1,711	1,895	1,764	1,959	2,166
1957	(4)	1.53	1.65	1.74	1,730	1,709	1,815	1,769	1,924	2,183
1958	(2)	1.40	1.43	1.46	1,318	1,452	1,586	1,814	2,006	2,197
1959	(1)	....	1.47	....	....	1,515	....	....	2,217	....
1960	(5)	1.52	1.60	1.73	1,487	1,727	1,997	1,759	2,019	2,326

Data for 1959 and 1960 is unadjusted for abnormal foundation or site costs, which makes these prices slightly higher than if adjusted as are prices for 1947–58



... Per Pupil Station

*1959 Costs unadjusted for abnormal foundation or site costs

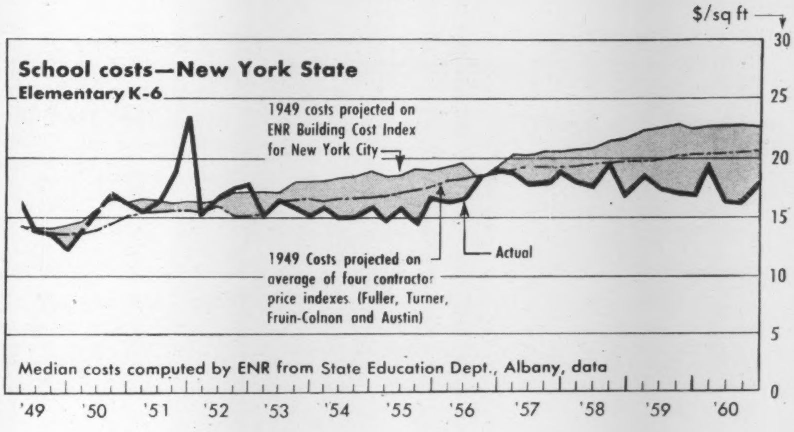
Source: Bureau of Construction, Board of Education, New York, N. Y.

School Building Contract Unit Prices, New York City—1959

No.	Size: min-aver-max pupil station	Large units	Min-aver-max COST per pupil station	Min-aver-max COST per cubic foot	Min-aver-max % of total building contract price general constr	heating	plumbing	electrical
5	K-6, new, 3-story 1,220-1, 281-1,323	aud; gym; lunch-playrm	$1,332-$1,519-$1,724	$1.53-$1.65-$1.84	73.5-74.6-75.8	9.7-10.1-10.4	6.3-6.4-7.1	8.3- 8.9-10.1
3	new, 4-story 1,276-1,277-1,279	aud; gym; lunch-playrm; cafet	1,657- 1,728- 1,824	1.61- 1.70- 1.87	75.8-76.1-76.3	9.3- 9.6- 9.9	5.5-5.8-6.1	8.5- 8.5- 8.6
2	add & mod, 2-story 196*	aud; gym; lunch-playrm	5,531	2.16- 3.21- 4.27	63.6-66.2-68.9	12.3-13.9-15.6	6.3-7.4-8.5	12.4-12.4-12.5
1	add & mod, 3-story 45*	aud; gym	3,231	4.18	62.1	16.3	8.6	12.9
1	mod, 5-story	aud; gym; lunch-playrm	....	....	65.5	13.4	6.8	14.3
1	JHS, new, 3-story 2,217	aud; gym; cafet	1,514	1.47	71.5	10.9	6.7	10.8
1	add & mod, 3-story 526*	aud; gym; cafet	4,644	2.90	63.3	14.0	9.1	13.5
1	add & mod, 4-story 677	aud; gym; cafet	2,327	2.38	62.6	9.4	10.1	17.9
1	add & mod, 5-story	aud; gym; cafet	....	....	53.7	7.9	14.4	23.9
1	HS, partial mod, 4-story 79*	aud; gym; cafet	1,348	....	24.3	8.7	25.7	41.3

* Net gain

and State



New York City paid an average of $1,643 a pupil station for elementary schools in 1960, and $1,727 for junior highs. This was a 2% drop in elementary school prices since 1959, but a jump of 12.3% in junior high school costs.

Prices for the fourteen elementary schools awarded in 1960 ranged from $1,442 to $2,185. The range for eight awards in '59 was $1,560 to $1,824. Junior high schools in 1960 went from a low of $1,487 to a high of $1,997 a pupil station.

Cube cost of elementary schools in 1960 averaged $1.65, a 1.2% drop from 1959's average. Junior highs rose from an average of $1.47 a cubic foot in 1959 to $1.60 in 1960. The elementary schools ranged from $1.55 to $1.90 in '60, while five junior high schools went from $1.52 to $1.73 a cubic foot.

The 1960 average for elementary schools is 5.5% short of 1957's all-time high yearly average of $1.74 a cubic foot. The drop is probably even greater than the '60 price indicates, since all figures used by the Board of Education prior to 1959 were adjusted for abnormal site costs, making subsequent unadjusted figures approximately 5% to 7% higher.

The lowest '60 monthly average was reached in September with $1.57, 9% under the September 1959 figure of $1.72—a peak for that year. It was also 17% under the 1956 high for September of $1.83 a cubic foot, and 28% below the highest point on the curve, $2.01, hit in September '54.

The number of new elementary schools awarded in 1960 rose 43% over last year's figure, and 50% over 1957, giving the city a chance to profit by lower bid prices.

While contractors rode the downward trend in elementary school costs started in 1957, ENR's Building Cost Index of basic materials and manpower rose 9.5% in the 1957-1960 period. The projection of 1949 actual costs by ENR's Building Cost Index lingered at $1.91 during most of last year, edging up slightly in July and August to $1.92.

Cube cost rose in the last months of '60, pushing up to a monthly average of $1.61 in October, and $1.76 in November. November hit the high point for the year, matching the high of January 1957. November's average is the highest point the monthly average has reached in the four years since the January '57 high.

Cost per pupil station also increased in November '60, rising to $1,815 for elementary schools, the highest monthly average since January 1952.

School Costs Per Square Foot in New York State

Source of information: State Education Department, Division of School Buildings and Grounds

	No. of Schools K-6 Total	Elementary, K-6 — Dollars per sq ft for schools with . . . One Large Unit* Min	One Large Unit* Med	One Large Unit* Max	Two Large Units* Min	Two Large Units* Med	Two Large Units* Max	Three Large Units* Min	Three Large Units* Med	Three Large Units* Max	No. of Schools 7-12 Total	Secondary, 7-12 Dollars per sq ft Min	Med	Max
1949	29	$10.40	$14.00	$19.20	$12.00	$14.60	$18.70				4	$13.20	$13.55	$16.20
1955	52	11.75	16.40	23.60	11.90	15.70	20.25	$14.90	$14.90	$15.90	13	12.55	17.10	18.50
1956	53	12.90	17.85	23.80	13.25	17.65	21.10	16.50	16.80	17.10	7	15.40	18.15	20.90
1957	50	14.65	19.28	25.20	12.90	18.10	21.75	.....	18.70	.....	10	16.40	18.61	20.60
1958	32	13.85	18.95	22.30	13.50	17.30	20.30	.....	.....	.....	8	15.90	16.55	19.70
1959	20	14.45	17.55	21.80	14.80	17.25	21.70	.....	.....	.....	1	.....	17.50	.....
1960	16	15.00	19.75	22.20	15.25	15.85	18.40	.....	.....	.....	4	14.80	17.39	19.70
'57, Q1	11	17.80	18.58	19.35	15.70	19.23	21.75	.....	18.70	.....	1	.....	18.51	.....
Q2	14	14.65	19.60	25.20	12.90	18.10	19.00	.....	.....	.....	5	18.70	19.35	20.00
Q3	11	18.60	19.15	19.40	14.40	17.78	18.40	.....	.....	.....	3	16.40	19.50	20.60
Q4	14	16.95	20.80	25.20	17.60	19.00	19.60	.....	.....	.....	1	.....	18.90	.....
'58, Q1	7	18.20	18.30	18.45	16.60	17.48	19.45	.....	.....	.....	2	16.60	17.30	18.00
Q2	9	16.65	18.55	20.30	16.30	17.80	19.35	.....	.....	.....	4	16.00	17.13	19.70
Q3	6	16.95	19.65	22.30	16.65	19.85	20.30	.....	.....	.....	..	.....	.....	.....
Q4	10	13.85	20.13	21.00	13.50	16.38	18.50	.....	.....	.....	2	15.90	16.20	16.50
'59, Q1	1	.....	.....	.....	.....	18.50	.....	.....	.....	.....	..	.....	.....	.....
Q2	6	16.20	17.68	19.00	15.20	17.00	18.80	.....	.....	.....	..	.....	.....	.....
Q3	8	14.70	21.00	21.80	14.80	15.30	17.30	.....	.....	.....	1	.....	17.50	.....
Q4	5	14.45	17.00	17.00	18.60	19.95	20.30	.....	.....	.....	..	.....	.....	.....
'60, Q1	4	20.90	21.10	21.30	15.25	16.82	18.40	.....	.....	.....	..	.....	.....	.....
Q2	8	18.60	20.40	22.20	15.30	15.50	17.00	.....	.....	.....	2	17.47	18.58	19.70
Q3	3	.....	15.00	.....	16.20	16.80	17.40	.....	.....	.....	1	.....	17.32	.....
Q4	1	.....	18.00	.....	.....	.....	.....	.....	.....	.....	1	.....	14.80	.....

*** Large unit includes a general purpose room, gymnasium, auditorium, multi-purpose or other group activity room.**

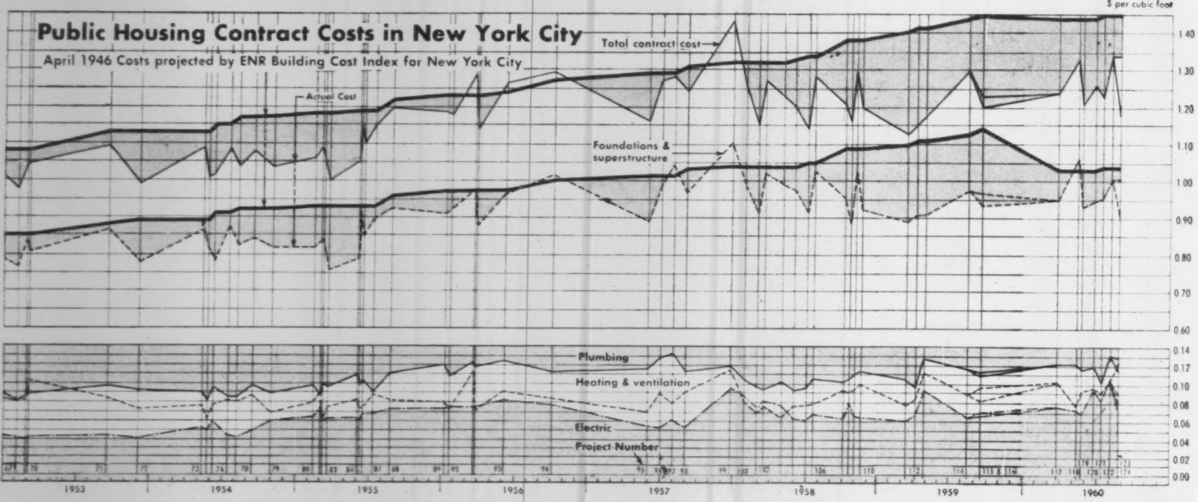
School districts outside of New York City saved on school construction costs as the yearly average of $17.49 a square foot dropped 1.6% under 1959's average, continuing the downtrend begun in '57.

The median costs in New York State elementary schools dropped from $19.65 a square foot in the first quarter of 1960 to $16.10 in the second, but pulled up in the third and fourth quarters to $16.20 and $18.00 a square foot respectively.

The first and fourth quarters of 1960 compared favorably with those of '59, the first quarter showing an increase of 5.8% over the 1959 price of $17.00. But it was not enough to reverse the downward trend caused by second and third quarter figures which ranged from $1.58 to $0.90 below the '59 median prices for the same quarters.

Current price projections of 1949 costs based on ENR's Building Cost Index of basic materials and manpower prices and on the average of four contractors bid price indexes moved closer together in the last quarter of 1960 (see above chart). After climbing steadily in the first three quarters of '60, the projection of '49 costs based on the Building Cost Index dropped from a third quarter figure of $22.78 a square foot to $22.79 in the fourth. The costs projection based on the four contractors average moved up, however, from a third quarter figure of $20.43 to $20.47 in the fourth quarter.

Four secondary schools, grades 7-12, were reported in 1960. Prices for the four schools ranged from a low of $14.80 to a high of $19.70 a square foot. Median costs dropped to $17.39 in '60, an $0.11 decline.



Public Housing Costs Up in New York

Prices for electrical work on public housing increased 12% in New York City last year compared with a 4% rise for superstructure. Heating and ventilating was up 8.3% and plumbing 7.5%. These higher prices on mechanicals pushed housing costs up 6%.

Foundation and superstructure prices increased $0.93 to $0.97 per cubic foot in 1960, the 4% rise. They accounted for only 76% of the housing dollar in 1960, down from 78% in 1959.

Electrical work showed the greatest increase in its proportion of the housing dollar, rising from 5.7% in 1959 to 6.5% in 1960. Heating and ventilating and plumbing also increased their proportion, rising from 7.3% to 6.5% and from 9.2% to 9.4% respectively.

The 6% increase in over-all housing costs reflects a jump of $0.07 in the cost per cubic foot. This puts average cube prices at $1.27 in 1960. For the eight projects awarded in 1960 prices ranged from $1.178 a cubic foot to $1.343 while 1959's prices went from a low of $1.126 to a high of $1.306.

Two state-aided housing developments were awarded in 1960. Ranging from $1.25 to $1.334 a cubic foot, they edged up over prices for last year's two, which ranged from $1.145 to $1.307.

Prices for federally aided housing also increased, as did the number of public housing contracts receiving federal aid. Costs for the two federally aided projects in 1959 ranged from $1.126 to $1.202. In 1960, six out of eight projects received federal aid, and the range of prices per cubic foot went from a low of $1.178 to a high of $1.343.

The total number of constructed rooms dropped in 1960 as the Municipal Housing Authority initiated its new "vest pocket" housing. These are smaller projects aimed at reducing relocation problems. Occupying less than a city block, they make possible the clearing of blighted areas without disturbing adjoining buildings. Audubon and Morrisania, the first of these projects, will have 749 and 859 constructed rooms respectively. Prices on these two jobs ranged from $1.25 a cubic foot to $1.34. These, plus Millbrook with 549 rooms at $1.334, were the highest priced buildings awarded per cubic foot.

Public Housing Unit Prices—1960

Awards by New York City Municipal Housing Authority

Project Number **Project Name**		(117) **Audubon** a	(118) **Millbrook Ext** a	(119) **Lafayette** b	(120) **Jackson** b	(121) **Sen. Taft II** def	(122) **West Brighton I** bc	(123) **Gouverneur Morris II** bc	(124) **Morrisania** bc
Total constructed rooms	**No.**	749	549	3,944	3,703	2,696	2,108	4,706	859
Total apartments	**No.**	168	125	882	868	672	490	1,085	206
Rooms per apartment	**Av. No.**	4.45	4.39	4.47	4.26	4.01	4.26	4.34	4.17
Total cubage	**Cu. Ft.**	1,585,892	1,130,657	8,369,220	7,682,714	5,823,566	4,850,947	10,179,716	1,787,662
Bid date		3/22/60	5/10/60	5/24/60	6/21/60	7/12/60	8/2/60	8/23/60	8/23/60
Cost per:									
Total contract		1,962,651	1,508,359	10,128,213	9,659,125	7,158,835	6,510,920	11,993,837.24	2,401,562.76
Constructed room		2,647.06	2,747.47	2,568.01	2,608.46	2,655.35	3,088.68	2,548.63	2,795.77
Apartment		11,801.49	12,066.87	11,483.23	11,128.02	10,653.03	13,287.59	11,054.23	11,658.07
Cubic foot		1.2503	1.3340	1.2101	1.2572	1.2293	1.3422	1.1782	1.3434
Foundations & superstructure		1,505,414	1,201,679	7,815,473	7,278,875	5,553,175	4,866,850	9,234,309.24	1,791,090.76
Constructed room		2,009.90	2,188.85	1,981.61	1,965.67	2,059.78	2,308.75	1,962.24	2,085.09
Apartment		8,960.80	9,613.43	8,861.08	8,385.80	8,263.65	9,932.35	8,510.88	8,694.62
Cubic foot		0.9492	1.0628	0.9338	0.9474	0.95356	1.0033	0.9071	1.0019
Heating and ventilation		163,500	86,400	767,000	737,950	524,900	502,600	826,840	222,160
Constructed room		218.29	157.38	194.47	199.28	194.70	238.43	175.70	258.63
Apartment		973.21	691.20	869.61	850.17	781.10	1,025.71	762.06	1,078.45
Cubic foot		0.1031	0.0764	0.0916	0.0961	0.09013	0.1036	0.0812	0.1234
Electrical construction		120,000	82,880	577,740	727,000	482,760	507,470	766,288	158,212
Constructed room		160.21	150.97	146.49	196.33	179.07	240.74	162.83	184.18
Apartment		714.28	663.04	655.03	837.56	718.39	1,035.65	706.26	768.02
Cubic foot		0.0757	0.0733	0.0690	0.0946	0.0829	0.1046	0.0753	0.0885
Plumbing		193,737	137,400	968,000	915,300	598,000	634,000	1,166,400	230,100
Constructed room		258.66	250.27	245.44	247.18	221.81	300.76	247.85	267.87
Apartment		1,153.20	1,099.20	1,097.51	1,054.48	889.88	1,293.88	1,075.02	1,116.99
Cubic foot		0.1222	0.1215	0.1157	0.1191	0.10269	0.1307	0.1146	0.1287
Piling, abnormal foundations		67,081 g	33,000 h	50,000	140,000	378,438.50	184,000	100,000	40,000

•a state aided project •b federally aided project •c cost and cubage adjusted for apportionment of boiler room •d proportionate part of cost of boiler plant included in heating & ventilating & total cost •e housing without cash subsidy •f part 4-city aided program •g includes $17,081 for street & yard improvements •h includes $10,000 for street & yard improvements

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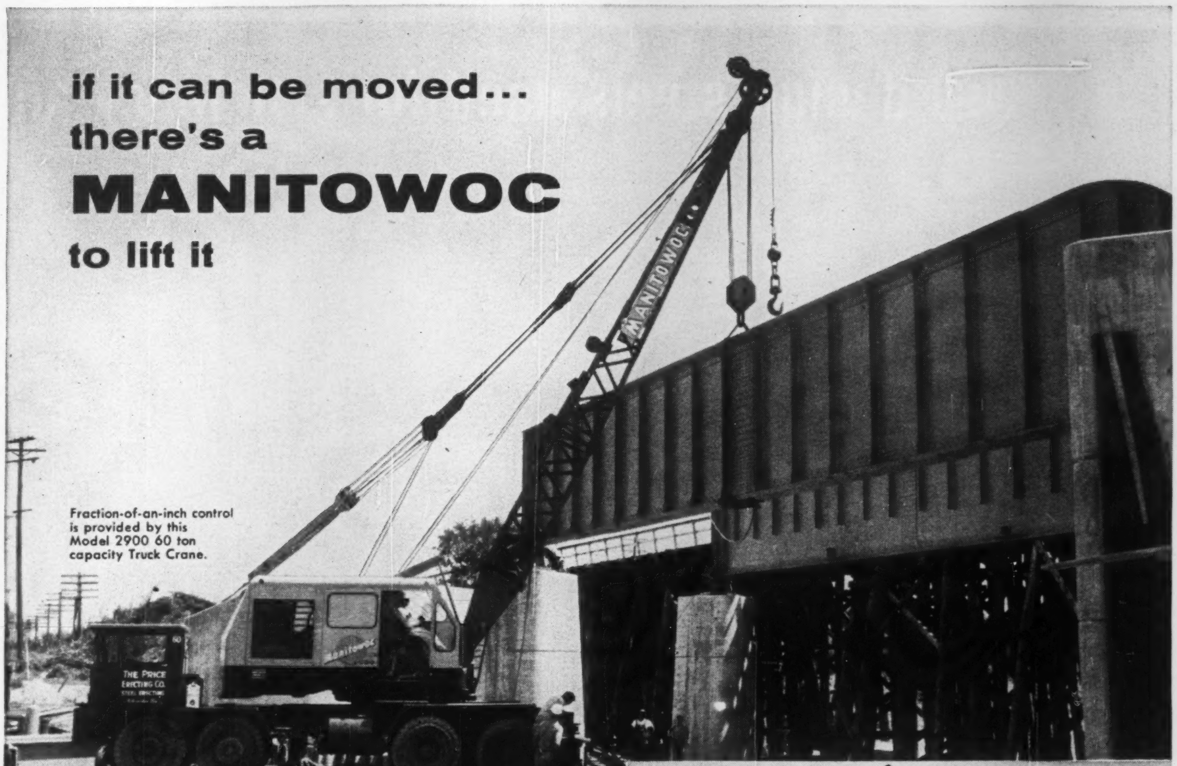

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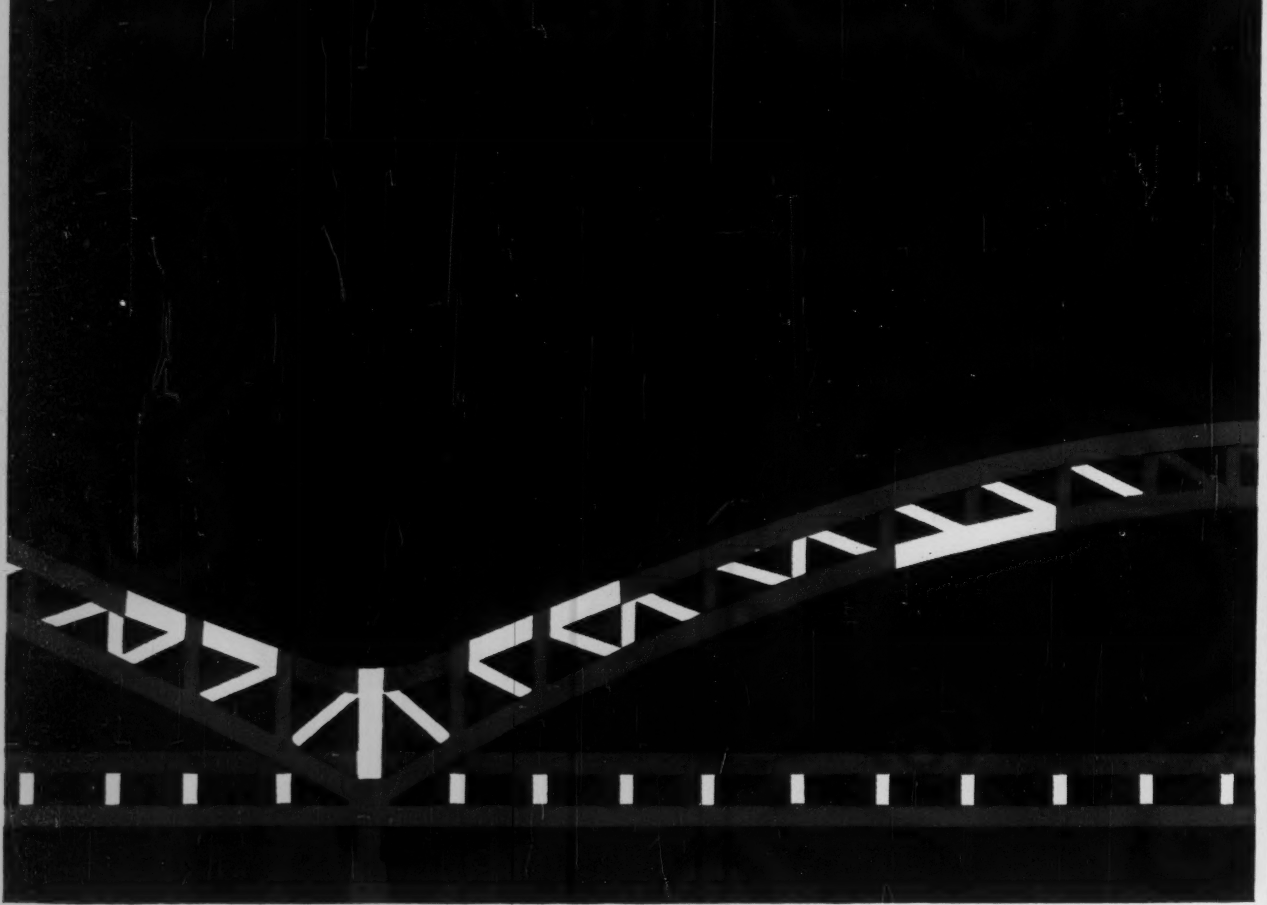
USS design steels used for efficiency and



Sketch of one span of the two-span bridge showing where it was most efficient to take advantage of the high yield strength provided by steels such as USS "T-1" Steel (in red), USS TRI-TEN High-Strength Low-Alloy Steel (in white), A7 and A373 Structural Carbon Steel (in gray). Louisville-New Albany Bridge

The new double-deck, two-span, tied-arch bridge spanning the Ohio River between Louisville, Kentucky, and New Albany, Indiana, should be extremely interesting to bridge designers and engineers.

Designed by the consulting firm of Hazelet & Erdal, this bridge is another fine example of the application of heat-treated constructional alloy steel, high-strength low-alloy and structural carbon steels to provide the desired strength at the least weight and lowest cost. A total of 7,641 tons of steel were used in the two 800-foot spans and the approaches.

Because much of this bridge was shop welded, the excellent welding properties of USS Design Steels played an important part in their selection. The weldable, constructional alloy USS "T-1" and high strength TRI-TEN Steels both permitted the design engineers to obtain considerable savings in the amount of steel needed, resulting in a substantial reduction in the total cost of the structure. The saving in steel tonnage reduced dead weight enough to effect still further savings by reduced loads on individual truss members, piers, and foundations.

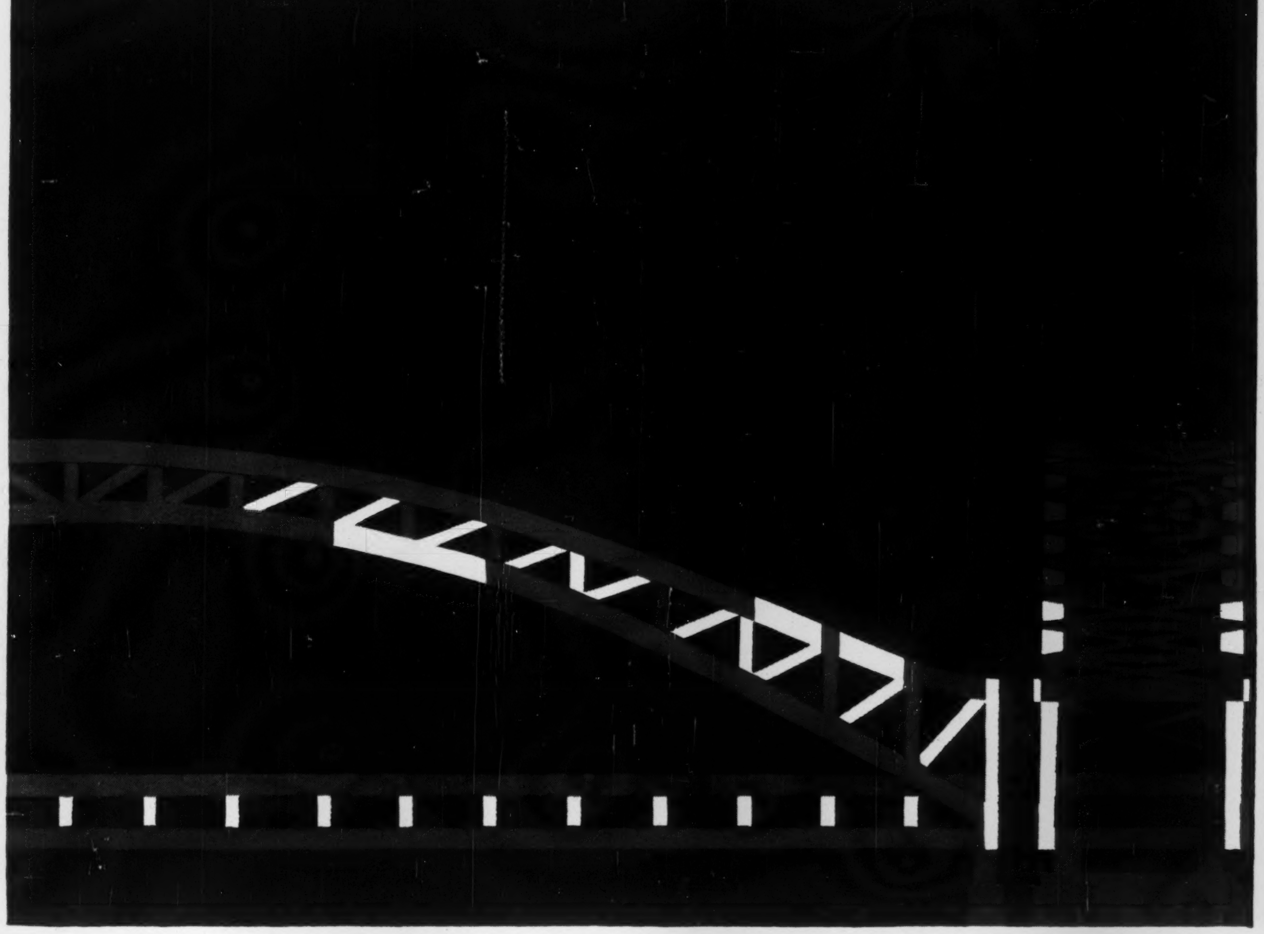
All of the tie and most of the highly stressed upper and lower chords and some verticals were made of 100,000 psi yield strength heat-treated constructional alloy steel. Approximately 1,500 tons of USS "T-1" Constructional Alloy Steel were used.

Most of the diagonals, some of the top and bottom chords and approach trusses called for 50,000 psi high-strength low-alloy ASTM A242 steel. USS TRI-TEN Steel—1,535 tons of it—was used for these applications. (USS TRI-TEN Steel can also meet specification ASTM A441.)

United States Steel also furnished 1,100 tons of ASTM A373 structural carbon steel where the weldable carbon grade was needed, and 1,550 tons of ASTM A7 structural carbon steel. The latter was used in the lesser stressed

This mark tells you a product is made of modern, dependable Steel

economy in Louisville-New Albany Bridge



was designed by Hazelet & Erdal, Consulting Engineers, Louisville, Kentucky, for the State Highway Department of Indiana and Kentucky Department of Highways. Fabricator: The R. C. Mahon Co., Detroit, Michigan. Erector: John F. Beasley Construction Co., Dallas, Texas (Sub-contractor to Mahon).

members of the bridge and approaches.

Two other USS High Strength Steels have been widely used for bridges—USS MAN-TEN ASTM A440 and USS COR-TEN Steels. Both have a 50,000 psi minimum yield point. USS COR-TEN Steel offers outstanding resistance to atmospheric corrosion and superior paint adherence qualities. It is a natural choice for riveted structures in corrosive areas. USS MAN-TEN ASTM A440 Steel is the lowest priced of our High Strength Steels and is generally used for riveted structures. Recently introduced, USS "T-1" Type A Steel is the newest member of our famous family of constructional alloy steels and offers, at the same strength level as "T-1" Steel, a more economical grade for applications 1" thick and under. For more information on any of these USS Design Steels, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS, "T-1", COR-TEN, TRI-TEN and MAN-TEN are registered trademarks

USS Steels for bridge design

	PSI Min. yield
Structural Carbon Steel for welding (A373)	32,000
Structural Carbon Steel (A7)	33,000
Structural Carbon Steel (A36)	36,000
USS COR-TEN High Strength Steel	50,000
USS MAN-TEN (A440) High Strength Steel	50,000
USS TRI-TEN (A441) High Strength Steel	50,000
USS "T-1" Constructional Alloy Steel	100,000

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USS **United States Steel**

60-7

EFFECTIVE WATER CONTROL

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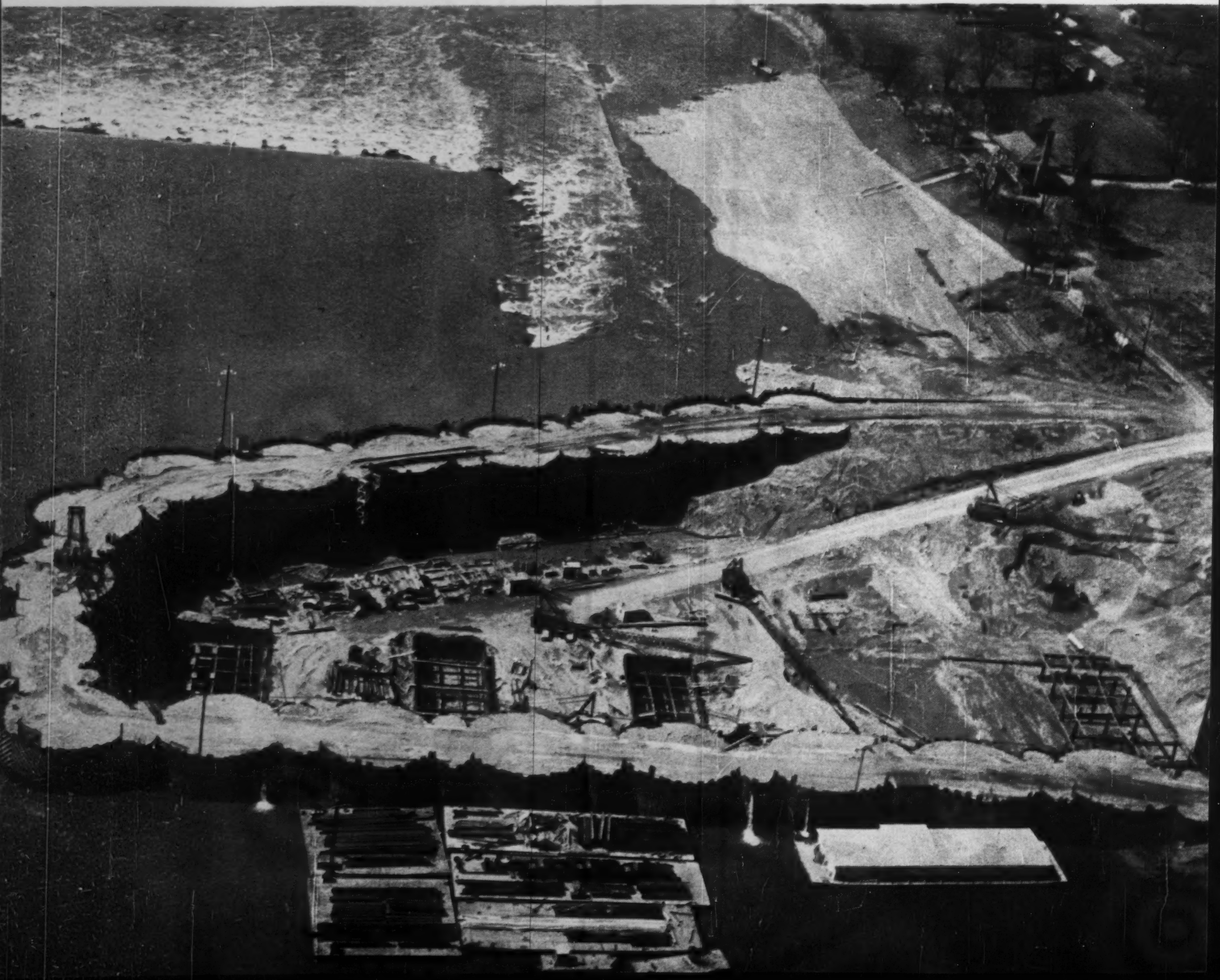

Building Costs in Detroit—Per Cubic Foot

Prepared and distributed by the Detroit Real Estate Board, 1961

Classification of Buildings	Aug 1915	Aug 1920	Feb 1 1925	Jan 1 1930	Jan 1 1931	Jan 1 1932	Jan 1 1935	Jan 1 1936	Jan 1 1937	Jan 1 1938	Jan 1 1940	Jan 1 1941	Jan 1 1942	Jan 1 1943	Jan 1 1944	Jan 1 1945	Jan 1 1946	Jan 1 1947	Jan 1 1948	Jan 1 1949	Jan 1 1950	Jan 1 1951	Jan 1 1952	Jan 1 1953	Jan 1 1954	Jan 1 1955	Jan 1 1956	Jan 1 1957	Jan 1 1958	Jan 1 1959	Jan 1 1960	Jan 1 1961
FACTORIES AND WAREHOUSES																																
Fireproof, under 300,000 cf	$0.14	$0.315	$0.23	$0.22	$0.165	$0.15	$0.165	$0.19	$0.215	$0.25	$0.25	$0.28	$0.30	$0.31	$0.32	$0.345	$0.35	$0.415	$0.45	$0.49	$0.50	$0.53	$0.55	$0.59	$0.62	$0.64	$0.67	$0.70	$0.72	$0.75	$0.78	$0.79
over 300,000 cf	.125	.29	.22	.21	.16	.145	.15	.17	.20	.21	.23	.25	.26	.275	.285	.31	.32	.38	.41	.45	.46	.485	.505	.545	.58	.60	.63	.66	.68	.71	.74	.75
Mill construction	.10	.225	.16	.155	.115	.11	.12	.14	.16	.17	.16	.17	.185	.20	.21	.23	.24	.27	.31	.335	.325	.35	.36	.38	.40	.41	.43	.45	.46	.48	.50	.50
Ordinary	.09	.21	.145	.135	.10	.095	.10	.115	.13	.14	.135	.16	.175	.19	.20	.215	.22	.245	.28	.30	.295	.32	.33	.35	.36	.37	.33	.40	.41	.42	.43	.43
Frame	.075	.17	.11	.10	.075	.07	.085	.10	.11	.10	.09	.12	.14	.15	.158	.175	.18	.21	.24	.265	.26	.285	.298	.31	.31	.31	.32	.33	.33	.34	.35	.35
STORES																																
Fireproof	.23	.52	.40	.385	.30	.295	.31	.355	.39	.42	.42	.46	.50	.53	.55	.59	.60	.675	.74	.80	.81	.85	.885	.95	1.01	1.04	1.09	1.14	1.17	1.23	1.28	1.30
Ordinary	.165	.375	.265	.25	.20	.19	.21	.24	.265	.22	.26	.29	.31	.34	.36	.39	.395	.44	.50	.54	.53	.57	.59	.62	.64	.65	.68	.72	.73	.75	.77	.78
Flats, above ordinary	.22	.485	.29	.27	.22	.21	.22	.25	.28	.255	.245	.275	.295	.33	.35	.38	.40	.455	.52	.56	.55	.59	.61	.64	.66	.67	.70	.74	.75	.77	.79	.79
Ordinary without bsmt	....	....	.19	.17	.143	.14	.15	.17	.19	.16	.17	.20	.22	.24	.25	.26	.265	.30	.34	.37	.365	.39	.40	.42	.44	.45	.47	.50	.51	.53	.54	.55
MARKETS																																
Ordinary without bsmt	....	....	....	....	....	....	....	....	....	....	.13	.145	.16	.18	.19	.205	.21	.25	.28	.30	.295	.315	.325	.34	.36	.37	.39	.41	.42	.43	.44	.44
CHURCHES AND THEATRES																																
Fireproof	.18	.405	.36	.35	.27	.26	.27	.31	.35	.38	.42	.50	.54	.56	.58	.63	.645	.72	.75	.81	.82	.87	.908	.95	.99	1.02	1.06	1.11	1.13	1.17	1.21	1.23
Ordinary	.155	.35	.275	.26	.205	.195	.22	.25	.28	.31	.30	.35	.38	.42	.44	.48	.49	.55	.60	.65	.64	.69	.71	.745	.76	.77	.80	.84	.85	.87	.89	.89
OFFICE BUILDINGS																																
Fireproof	.305	.685	.52	.50	.39	.375	.39	.445	.50	.55	.54	.59	.64	.67	.69	.748	.75	.85	.95	1.03	1.04	1.10	1.145	1.22	1.27	1.31	1.36	1.43	1.46	1.51	1.57	1.59
Ordinary	.22	.485	.335	.32	.25	.24	.265	.30	.335	.36	.32	.375	.40	.435	.46	.50	.52	.59	.67	.72	.71	.77	.80	.84	.85	.86	.89	.93	.94	.96	.98	.98
HOTELS																																
Fireproof	.335	.755	.57	.56	.428	.42	.45	.52	.58	.60	.59	.64	.69	.72	.74	.80	.82	.92	.99	1.07	1.08	1.15	1.195	1.27	1.33	1.37	1.42	1.49	1.52	1.57	1.63	1.65
Ordinary	.295	.665	.34	.31	.255	.24	.265	.30	.34	.34	.32	.375	.40	.45	.475	.518	.53	.585	.66	.71	.695	.75	.78	.82	.84	.85	.88	.92	.93	.95	.97	.97
SCHOOLS																																
Fireproof	.22	.485	.435	.40	.32	.30	.33	.38	.425	.455	.45	.50	.54	.56	.58	.63	.645	.73	.82	.89	.90	.955	.99	1.05	1.09	1.12	1.16	1.22	1.25	1.30	1.35	1.37
HOSPITALS																																
Fireproof	.32	.72	.435	.45	.32	.32	.335	.385	.43	.60	.60	.66	.715	.725	.745	.808	.82	.885	.98	1.06	1.07	1.14	1.185	1.26	1.32	1.36	1.41	1.48	1.51	1.57	1.63	1.65
ALL STEEL BUILDINGS																																
Under 20,000 cf	.12	.25	.14	.13	.11	.11	.12	.14	.16	.17	.14	.15	.16	.165	.175	.19	.195	.22	.245	.265	.27	.29	.30	.32	.33	.34	.36	.38	.39	.40	.42	.42
20,000 to 100,000 cf	.08	.18	.12	.105	.10	.10	.105	.12	.13	.14	.12	.14	.155	.16	.17	.183	.19	.215	.24	.26	.265	.27	.28	.30	.31	.32	.34	.36	.37	.38	.40	.40
Over 100,000 cf	.065	.14	.10	.09	.07	.07	.075	.085	.095	.10	.10	.115	.125	.13	.14	.15	.16	.18	.20	.215	.22	.235	.245	.26	.27	.28	.30	.32	.33	.34	.35	.35
APARTMENTS																																
Fireproof	.35	.78	.525	.50	.39	.375	.41	.47	.52	.55	.55	.595	.64	.67	.695	.75	.77	.87	.96	1.04	1.05	1.12	1.165	1.24	1.29	1.33	1.38	1.45	1.48	1.53	1.58	1.60
Protected	.295	.665	.46	.45	.345	.34	.36	.41	.46	.48	.455	.505	.55	.57	.59	.64	.655	.70	.77	.84	.84	.89	.92	.97	1.00	1.02	1.06	1.11	1.13	1.16	1.20	1.21
Brick, ordinary	.28	.63	.32	.29	.24	.23	.265	.30	.335	.44	.36	.41	.445	.47	.498	.54	.56	.62	.71	.77	.75	.81	.84	.88	.89	.90	.93	.97	.98	1.01	1.04	1.04
veneer	.24	.54	.30	.28	.225	.22	.255	.28	.31	.31	.255	.31	.34	.365	.38	.41	.43	.48	.55	.595	.58	.63	.65	.68	.69	.70	.73	.77	.78	.80	.82	.82
RESIDENCES																																
Brick, with 12" bsmt wall	.305	.685	.46	.445	.345	.335	.31	.34	.38	.36	.32	.36	.40	.455	.46	.50	.52	.59	.67	.72	.71	.77	.79	.82	.84	.85	.88	.92	.93	.95	.98	.98
1-story with 8" bsmt walls, not over 18,000 cf	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.36	.39	.40	.46	.52	.56	.55	.61	.625	.65	.66	.67	.70	.73	.74	.76	.78	.78
veneer or stucco	.24	.54	.325	.305	.24	.23	.25	.27	.30	.30	.275	.315	.35	.37	.37	.40	.42	.47	.53	.56	.55	.595	.615	.64	.66	.67	.70	.73	.74	.76	.78	.78
veneer or stucco, 1 story	....	....	....	....	....	....	....	....			.235	.30	.33	.36	....																	
veneer or stucco, 1-story not over 18,000 cf	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.35	.38	.39	.44	.50	.54	.53	.575	.595	.63	.64	.65	.67	.70	.71	.73	.75	.75
Frame	.215	.485	.265	.24	.20	.19	.215	.23	.26	.24	.19	.25	.28	.31	.32	.36	.37	.41	.47	.50	.485	.52	.54	.57	.58	.58	.60	.63	.63	.64	.66	.66
not over 25,000 cf	....	....	....	.20	.15	.15	.17	.19	.21	.21	.18	.23	.24	.30	....																	
1—1½ stories not over 18,000 cf	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.31	.34	.36	.39	.45	.49	.475	.51	53	.55	.56	.56	.58	.61	.61	.62	.64	.64
Cinder concrete block	....	....	.39	.37	.29	.28	.27	.31	.35	.35	.30	.34	.38	.42	.43	.46	.475	.51	.58	.62	.61	.66	.68	.71	.73	.74	.77	.81	.82	.84	.86	.86
concrete block, 1-story not over 18,000 cf	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.34	.37	.38	.42	.47	.52	.51	.56	.58	.60	.62	.63	.65	.68	.69	.71	.73	.73
GARAGES																																
Gas and Service Station	....	....	....	....	....	....	.265	.30	.34	.36	.35	.425	.45	.48	.48	.50	.53	.65	.67	.72	.73	.78	.81	.86	.89	.91	.94	.99	1.01	1.04	1.07	1.08
Fireproof	....	.30	.23	.23	.17	.17	.18	.21	.235	.25	.25	.28	.30	.31	.32	.345	.35	.415	.45	.49	.49	.52	.54	.58	.62	.64	.67	.70	.72	.75	.78	.79
Mill construction	....	.20	.15	.135	.11	.11	.12	.14	.16	.175	.15	.18	.19	.21	.22	.24	.25	.27	.31	.34	.33	.35	.365	.38	.40	.41	.43	.45	.46	.48	.50	.50
Ordinary	....	.17	.135	.13	.10	.10	.105	.12	.13	.14	.135	.15	.16	.17	.18	.195	.20	.23	.26	.28	.275	.30	.31	.32	.34	.35	.36	.38	.39	.40	.41	.41
Frame	....	.14	.10	.09	.08	.07	.08	.09	.10	.11	.085	.105	.11	.12	.125	.14	.15	.17	.195	.21	.20	.22	.23	.24	.25	.25	.26	.28	.28	.29	.30	.30
SHEDS WITHOUT HEAT																																
Enclosed without floor, frame	....	....	....	....	.048	.045	.05	.055	.06	.055	.05	.06	.065	.07	.075	.08	.085	.10	.11	.12	.115	.125	.13	.14	.14	.14	.15	.16	.16	.16	.17	.17
frame	....	....	....	....	.06	.06	.065	.07	.08	.08	.07	.08	.09	.10	.105	.115	.12	.135	.145	.155	.15	.16	.168	.175	.18	.18	.19	.20	.20	.20	.21	.21
ordinary construction	....	....	....	....	.095	.093	.105	.12	.13	.14	.10	.115	.125	.14	.15	.16	.17	.19	.20	.215	.21	.22	.228	.24	.25	.25	.26	.28	.29	.30	.31	.31
without floor, ordinary construction	....	....	....	....	.093	.09	.10	.115	.125	.13	.09	.10	.11	.12	.13	.14	.15	.17	.185	.20	.19	.205	.21	.22	.23	.23	.24	.25	.26	.27	.28	.28
all steel	....	....	....	....	.045	.045	.05	.055	.06	.07	.06	.07	.075	.08	.09	.10	.105	.12	.13	.14	.145	.155	.16	.17	.18	.19	.20	.21	.22	.23	.24	.24
without floor, all steel	....	....	....	....	.035	.035	.04	.045	.05	.06	.05	.06	.065	.07	.08	.09	.10	.11	.12	.13	.135	.14	.145	.155	.16	.16	.17	.18	.19	.19	.20	.20
Open shelter, frame construction	....	....	....	....	.03	.03	.035	.04	.05	.043	.045	.05	.055	.06	.07	.08	.085	.10	.105	.11	.10	.11	.115	.12	.12	.12	.13	.14	.14	.14	.14	.14

Costs Roundup—1st Quarter

Where the Building Dollar Goes

Unit and Ratio Costs supplied through the courtesy of Gust K. Newbergh Construction Co., Chicago, Ill.; Lindgren & Swinerton, Inc., Los Angeles, Calif.; Charles T. Tompkins Co., Washington, D. C.

TYPE OF: Building	Hospital a*		Hospital b*		Office & Factory		Office & Factory		Office	
Construction: frame	concrete & steel		concrete & steel		steel		steel		steel & concrete	
outside walls	brick, concrete block back-up		brick, concrete block back-up		factory-concrete tilt-up walls; office-masonry		concrete tilt-up walls		marble & brick	
Date construction started	Feb. 1959		Feb. 1959		Apr. 1960		May 1960		Oct. 1957	
Location	Cleveland, Ohio		Cleveland, Ohio		Fullerton, Calif.		Anaheim, Calif.		Washington, D. C.	
SIZE OF BLDG:										
Height, stories	5, basement & penthouse		2, basement & penthouse		factory, 1; office, 2 c		2, 35 ft high		6	
Floor area, sq ft	139,478		89,703		108,000 d		164,000		120,000	
Volume, cu ft	1,757,423		1,130,258		2,121,400 e		4,900,000		1,695,852	
RANGE of Cost of this type Bldg:										
$ per sq ft	$28.65		$25.89		$9.32		$9.65		$27.29	
$ per cu ft	2.27		2.05		0.47		0.32		1.93	
% Air Conditioned	20%		20%		100%		100%		100%	
Engineering News-Record Building Cost Index (1913=100) 20-cities average	537		537		556		559		517	
PRINCIPAL ITEMS OF COST	—$ and % of Total Cost—									
	$	%	$	%	$	%	$	%	$	%
Excavation & site improvements	197,600	4.90	156,960	6.76	60,500	6.01	140,100	8.84	36,429	1.11
Foundations	161,280	4.00	203,050	8.74	67,000	6.66	114,000 k	7.20	95,301	2.91
Structural frame	554,950	13.90	363,730	15.65	55,000 l	5.46	117,700 l	7.43	575,339	17.56
Cement finish work	43,350	1.10	26,180	1.13	45,500	4.52	131,900 m	8.33	39,090	1.19
Exterior masonry	262,870	6.60	160,910	6.90	33,000	3.28	6,500	0.41	627,250	19.15
Wall panels	7,860 f	0.19	1,720 f	0.07	30,000 n	2.98	52,000 n	3.30	....	.....
Interior partitions	170,180	4.30	133,610	5.80	9,700 o	0.96	....	.....	34,354	1.05
Carpentry & millwork	21,990	0.55	7,090	0.31	100,000	9.93	32,000	2.00	39,930	1.22
Sash & glazing	141,560	3.50	58,170	2.50	7,100	0.71	9,700	0.61	108,437	3.31
Doors	37,800	0.95	19,000	0.82	incl in carpentry		incl in carpentry		incl in interior partitions	
Roofing	49,300	1.23	26,100	1.12	15,200 p	1.51	22,700 q	1.43	20,915	0.64
Insulation	14,580	0.36	7,550	0.33	3,800	0.38	330.00	0.02	....	.....
Waterproofing & dampproofing	8,530	0.20	5,950	0.26	incl in roofing		incl in roofing		11,380	0.35
Metal lath, furring, & plastering	169,200	4.23	105,000	4.52	22,300 r	2.22	54,000 r	3.41	129,450	3.95
Hollow metal work	64,610	1.62	31,590	1.36	1,200	0.12	900.00	0.05	2,000	0.06
Misc. Iron & ornamental metal	48,650	1.22	51,250	2.20	....	.....	....	.....	62,800	1.92
Tile, terrazzo, & marble	127,590	3.20	22,220	0.95	7,700 s	0.77	1,400 s	0.09	114,920	3.51
Floor Covering	25,020	0.63	20,500	0.88	6,300	0.63	11,000	0.70	11,070	0.34
Painting	42,950	1.10	25,660	1.10	19,400	1.93	30,800	1.95	16,728	0.51
Finish hardware	51,150	1.30	24,750	1.06	9,700	0.96	9,000	0.57	13,056	0.39
Acoustical ceilings	60,000	1.50	33,100	1.42	11,700	1.16	41,000	2.60	24,074	0.74
Plumbing	276,320	6.90	173,210	7.46	75,300	7.48	434,000	27.41	643,760	19.65
Heating, ventilating, & air conditioning	536,550	13.42	243,220	10.47	142,400	14.14	incl in plumbing		....	.....
Electrical work & light fixtures	314,100	7.90	187,500	8.07	222,400	22.09	270,000	17.05	523,120	15.96
Elevators	62,000	1.60	39,890	1.72	....	.....	16,500	1.00	114,510	3.50
Power plant	168,500	4.20	98,250	4.23	....	.....	....	.....	....	.....
Intercommunication systems & TV	48,500	1.20	3,500	0.15	....	.....	....	.....	28,472 v	0.87
Incinerator	....	.....	....	.....	....	.....	....	.....	2,700	0.08
Fire sprinklers	....	.....	....	.....	39,300	3.90	55,000	3.50	....	.....
Production equipment	192,200 g	4.80	56,340 g	2.43	....	.....	....	.....	208.00 w	0.01
Special equipment	128,840 h	3.20	34,070 h	1.47	11,200 t	1.11	....	.....	....	.....
Miscellaneous	8,250 i	0.20	2,750 i	0.12	4,100 u	0.41	....	.....	600.00 x	0.02
Parking lot	....	.....	....	.....	6,800	0.68	32,870	2.10	....	.....
Total Cost	$3,996,280	100%	$2,322,820	100%	$1,006,600	100%	$1,583,400	100%	$3,275,893	100%

* part of multi-bldg project with overall cost of $21,737,000 a surgical, 121 beds b TB & NP, 157 beds c factory, 22 ft high; office, 24 ft high d factory, 83,700 sf; office, 24,300 sf e factory, 1,841,000 cf; office, 280,400 cf f metal g sterilizer & laboratory h bldg specialties & casework i X ray protection j incl insurance & bond k incl slab on grade l incl misc iron m 2nd floor n tilt-up conc o movable p incl sheet metal q incl sheet metal-roofing, $12,800; sheel metal, $9,900 r incl drywall s tile & terrazzo only t cranes u demolition v conveyors w vault doors x cabinets

This report is the nineteenth in Engineering News-Record's Building Dollar series. Earlier reports were published in ENR Oct., 1953; Sept. 29, 1955; July 5, 1956; Aug. 2, 1956; Dec. 6, 1956; Oct. 17, 1957; Mar. 20, 1958; Dec. 25, 1958; Mar. 19, 1959; June 18, 1959; Dec. 17, 1959; Mar. 24, 1960; June 23, 1960; Sept. 22, 1960; Dec. 22, 1960.

Three of the five buildings listed above used a frame construction combining steel and concrete, while two used only steel. Structural frame using steel alone ranged from 5.5 to 7.4% of the total cost of the building.

Both steel-frame structures were office-factory combinations, and of the five buildings they reported lowest cubic foot costs. An office-factory in Anaheim, Calif., cost $0.32 a cubic foot, while a similar building in Fullerton, Calif., cost $0.47. The Anaheim structure combines both office and factory in the same building, while the Fullerton job, accounting for the increased cube cost, provides two separate strutcures, a factory with concrete tilt-up walls and an office with masonry walls.

Two hospital structures in Cleveland, Ohio, had the highest cube cost of buildings analyzed. Both are part of a multi-building project containing 1,000 beds at a cost of $21,737 per bed. Of the two hospitals reported, one is for surgical, contains 121 beds, and costs $2.27 a cubic foot. The second, for tuberculosis and neuropsychiatric disorders, cost $0.22 less a cubic foot and contains 157 beds.

DIFFICULT FOUNDATION WORK:

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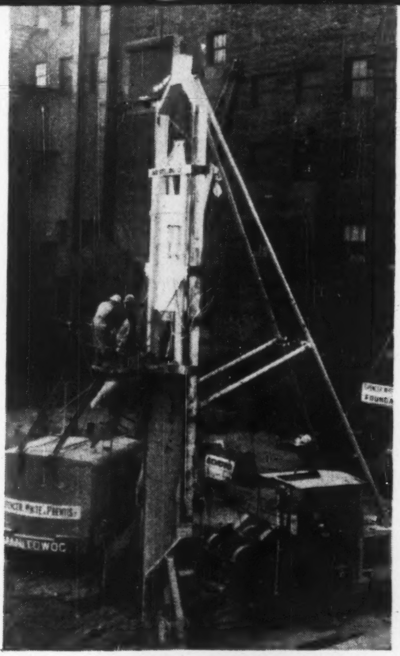
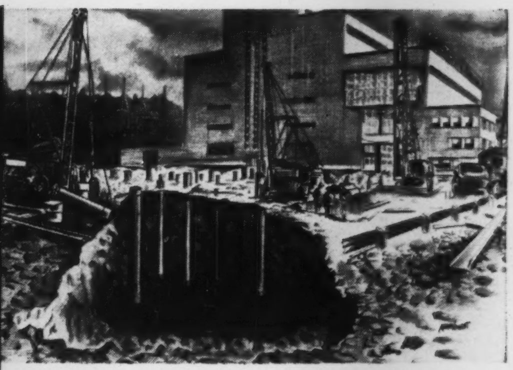
We are equipped to provide complete dependable service on the various types of foundations pictured here or any other specialized foundation problem.



Machine-drilled caissons. Benoto machine shown at left.



Drilled-In Caissons: steam station for Central Hudson Gas & Electric Corp., Danskammer Point, Roseton, N. Y.

Pipe piles: industrial service building for Colgate-Palmolive Company, Jersey City, N. J.

H-Beam piles: 145,000 linear ft. driven for addition to Smithsonian Institution, Washington, D. C.

Open piers to rock: Battery Parking Garage, New York, N. Y.

Spencer, White & Prentis INC.

10 E. 40th St., New York 16, N. Y.

Detroit: 2033 Park Ave. • Chicago: 221 North LaSalle St. • Washington, D. C.: Tower Bldg.

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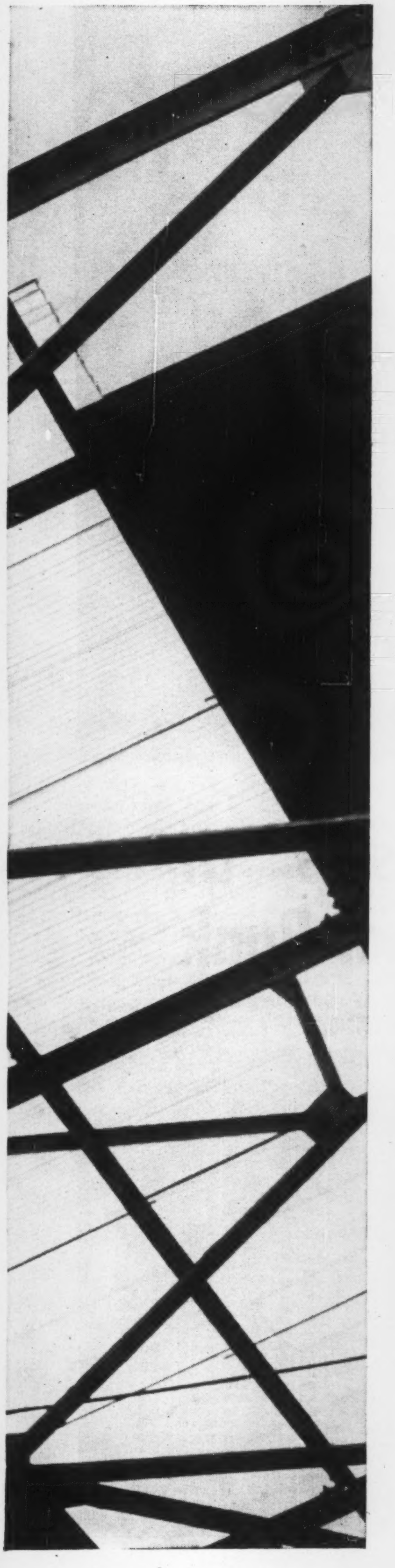


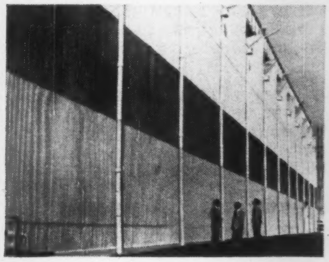
LOOK UP TO ALSYNITE

Shatterproof Alsynite daylights your building— cuts maintenance costs 30% to 60%

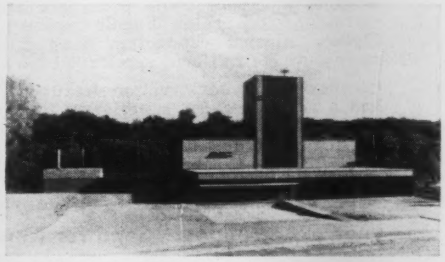
Things start looking up right away – the day you install Alsynite. This modern reinforced translucent panel provides today's best answer in daylighting modern plants and offices. Alsynite transmits only diffused glare-free light, so you get the illumination that means a saving in electricity, while eliminating the hazards of deep-shadow and glaring sun-spots.

Just as important – Alsynite is shatterproof! In skylights, sidelights and sash it eliminates replacement and shaves maintenance costs to effect savings of from 30% to 60%. Made in a wide variety of corrugations and shapes to nest with other standard building materials, or in flat panes to fit standard sash, or to special requirements on order. Alsynite is reinforced with millions of glass fibers, can be installed without special handling or tools.

Alsynite's own guarantee is backed by the world-wide reputation of RCI, one of the great names in chemicals. Talk over your requirements with your nearest dealer, listed in the Yellow Pages under plastic products. Or for free literature, write Alsynite, San Diego 9, Calif., Dept. ENR-361.



EASY TO INSTALL AND MAINTAIN! No special handling or tools needed. Alsynite keeps costs down!



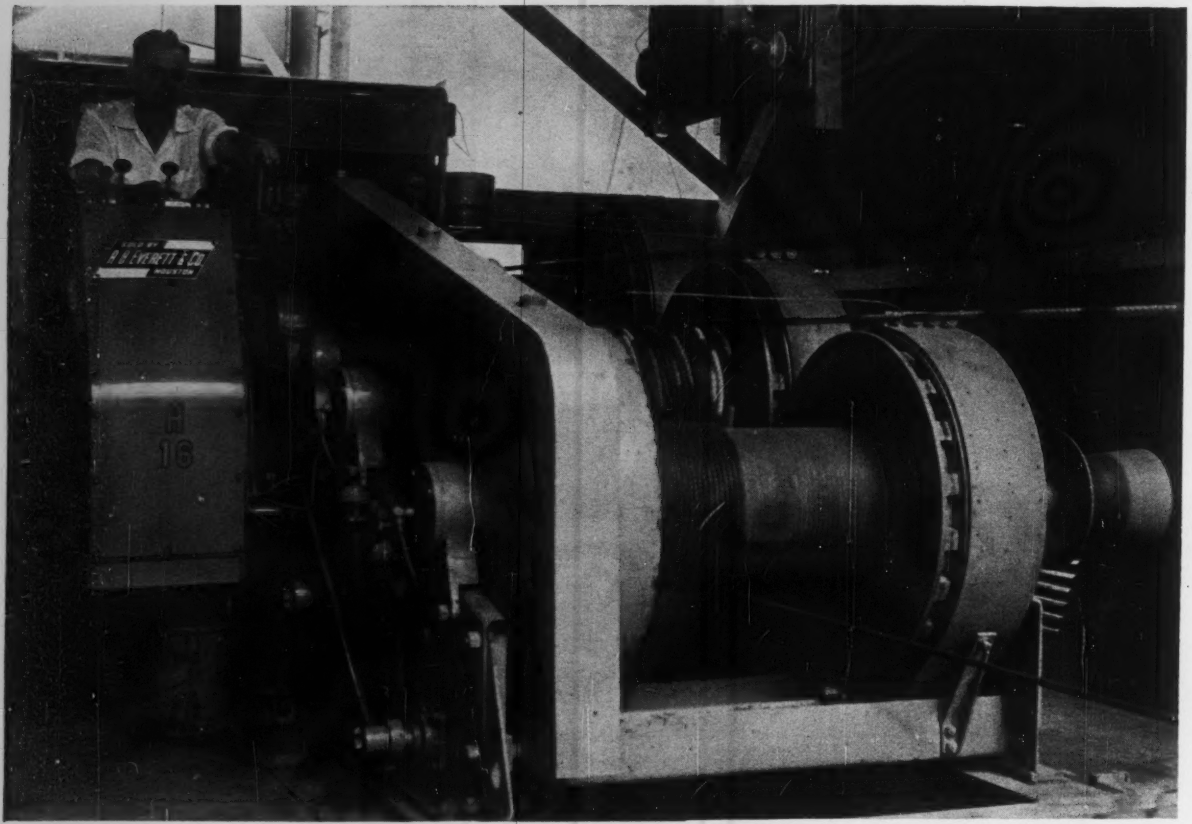
CONTEMPORARY APPEARANCE! Alsynite adds much to the appearance of buildings like the JFG Instant Coffee Plant, Knoxville, Tennessee.

ALSYNITE

TRANSLUCENT PANELS

RCI

A DIVISION OF REICHHOLD CHEMICALS, INC.



with Safety and Accuracy . . .

Clyde Hoist makes "deposits" at Houston's First City National Bank

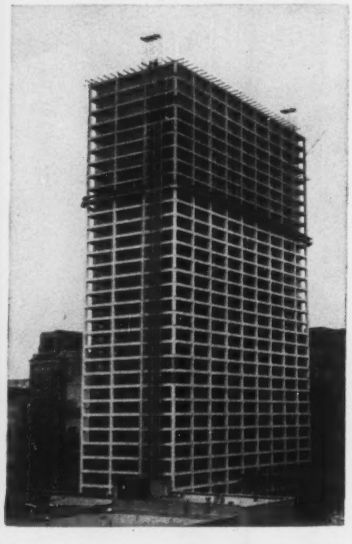
A major portion of the construction materials 'deposited' in the First City National Bank were speedily spotted with this Clyde Frame-6 Hoist . . . hoists noted around the world for dependable, efficient service.

Clyde's reputation is born of many 'plus' features that permit operator to hoist and spot loads with ease and accuracy. Large diameter, extra-capacity brakes handle maximum loads by light toe action. Clyde's internal expanding, band friction clutches give smoother, more positive full-load service.

Comparison of construction features shows why Clyde Hoists have had a reputation for superiority for more than half a century! All steel bed and side frames, high strength spur gears, anti-friction bearings throughout are but a few of the many extra values built into all Clyde Hoists . . . from 3,000 to 80,000 pounds line pull.

There is a Clyde Hoist to fit your requirements . . . to exceed your expectations! Send for Hoist Bulletin 34.

The 32 story First City National Bank adds an impressive landmark to the Houston skyline. Contractor; W. S. Bellows Construction Corp.



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UNLOADERS : CAR PULLERS : ROLLERS

New York's Stadium Is Over Estimate

Piling to overcome bad foundation conditions accounts for $2 million of arena's $16.5 million

Despite a $1.5-million cost boost over both the engineer's estimate and the amount that can be liquidated under a proposed lease to the new National League Metropolitan Baseball Club, New York City's Department of Parks awarded five contracts to the tune of $16,527,779 for Flushing Meadow Park Sports Stadium, Praeger-Kavanagh-Waterbury, New York City, are the engineers.

Because the project was to be self-liquidating, the city planned to borrow the cost of construction outside of its debt limit; when costs zoomed over expectations, however, it was suggested the city borrow the additional funds by selling bonds within the debt limit.

The joint venture of P. J. Carlin Construction Co., Long Island City, and Thomas Crimmins Contr. Co., New York City, took the general construction contract, 75% of total cost, with a price of $12,368,979, only 2% under the second low, H.R.H. Construction Corp., New York, but 17½% over the estimate.

The heating and ventilating award went to Alex C. Patterson & Sons, New York, for $370,000. This was just 2% below the second of seven, Taggert Co., New York, but 27½% over the estimate.

Similarly, Otis Elevator Co., New York, took the elevators and moving stairs contract 2% under the only other bidder, Peele Co., Brooklyn, but 7% over its estimate.

On the other hand, plumbing went to Astrove Plumbing and Heating Corp., Long Island City, at $62,800, 9.9% under the estimate and 1.2% under C. K. Rehner, Inc., New York, second of nine bidders.

Bidding on the electrical contract was really tight, and 2.3% under the estimate. Mager Electric Co. Inc., Brooklyn, bid $1,798,000, a scant $2,000 under the second low.

A ticket to the Flushing Meadow stadium will entitle New York sports fans to such unusual features as rotating stands and unobstructed viewing from every seat in the house. Approximately 10,000 seats on the field level are designed to shift with the seasons so that they can be both right behind the dugout and on the fifty yard line. Fans will see the field from any seat, however, since all of the columns are located behind the seating areas.

The stadium will have a circular layout with an outside diameter of about 765 ft. The maximum height of the structure will be approximately 150 ft, and all of the seats in the upper levels may be reached by moving stairs.

Subsoil conditions at the site are notable for fill where substantial settlements observed in recent years require pile foundations designed to transmit the stadium loads to an adequate sand stratum below many feet of compressible material.

The stadium adjoins the 1964 World's Fair site and will share in New York's plans to make it the most accessible in the country with a direct connection to the New York City subway system, immediate access to several major parkways, and bus and railroad transportation. Extensive parking areas will be provided.

Hourly wage rates in New York City include: common labor, $3.55 plus $0.28 fringe benefits; carpenter, $4.65 plus $0.37; structural iron workers, $4.95 plus $0.69; and electrical workers, $4.40 plus $1.26.

The bidding included:

General Construction

1C	P. J. Carlin Const. Co., Long Island City, N, Y, & Thomas Crimmins Contr. Co., Inc., New York, N. Y.	$12,368,979
2	H.R.H. Const. Corp., New York, N. Y.	12,650,000
12	The Frouge Corp., New York, N. Y.	15,386,634
EE	Praeger-Kavanagh-Waterbury, New York, N. Y.	10,529,000

Bids: 1-24-61 Items	Unit	Quantity	Unit Prices 1C	 2
Base Bid				
Borings, soil	lf	3,900	$3.50	$3.50
Bottle samples	ea	850	0.50	0.50
Tests, load	ea	6	2,500	1,500
Ties, timber, bms, jts	ls	job	13,000	14,000
Piles, timber, 60′ long	lf	63,000	3.00	2.85
70′–80′ long	lf	112,500	3.50	3.50
80′–100′ long	lf	225,000	3.70	2.90
100′ long	lf	168,000	3.80	2.75
Stadium	ls	job	8,642,800	9,348,793
Clear, grub, clean up	ls	job	19,000	2,000
Exc, uncl	cy	122,600	1.55	1.55
Demolition	ls	job	8,500	8,000
Manholes, tp A	ea	3	600.00	600.00
tp B	ea	1	1,500	1,500
Catch basins, tp A	ea	50	800.00	800.00
tp B	ea	18	800.00	800.00
tp C	ea	2	1,200	1,300
Invert, paved, ACCMP,				
12″φ	lf	870	5.00	4.90
15″φ	lf	1,740	5.50	5.50
18″φ	lf	820	6.00	6.00
24″φ	lf	1,460	7.00	7,30
30″φ	lf	270	10.00	10.00
36″φ	lf	1,460	15.50	15.30
42″φ	lf	1,170	20.00	20.00
48″φ	lf	1,490	23.00	23.00
54″φ	lf	310	30.00	28.00
66″φ	lf	290	40.00	38.00
72″φ	lf	440	50.00	47.00
Conc curb, tp 1	lf	17,350	2.25	2.35
tp 2	lf	2,280	2.00	2.10
tp 3	lf	290	2.30	2.25
tp 4	lf	3,520	2.00	2.05
Asph conc pvt, tp A-1	sy	5,270	3.50	4.00
tp A-2	sy	191,560	2.50	2.70
Asph conc pvt, tp B-1	sy	10,390	5.00	6.00
tp B-2	sy	3,150	4.00	4.00
tp D	sy	24,670	2.50	3.00
Cmt conc pvt, tp C	sy	8,680	10.00	10.00
Conc pipe, porous, underdrain, 6″φ	lf	4,400	3.75	3.30
10″φ	lf	620	5.00	4.00
Skinned area	ls	job	2,300	2,500
Toll booths	ea	18	4,800	3,300
Fence, chain link & gates, recondition existing	ls	job	5,200	2,000
6′ high	lf	2,820	3.50	4.00
8′ high	lf	820	4.50	5.00
11′ 6″ high	lf	520	7.25	8.00
Gates,				
single swing, 6′ high	ea	3	125.00	200.00
double swing, 6′ high 44′ opening	ea	6	600.00	750.00
11′ 6″ high 12′ opening	ea	2	350.00	400.00
Gates, sliding, double, 6′ high, 62′ opening	ea	2	1,500	2,000
8′ high, 12′ opening	ea	6	500.00	400.00
Cinder track	sy	970	2.20	2.00
Painted lines	ls	job	9,000	9,000
Topsoil, f & p	cy	21,000	4.25	3.30
Humus	cy	2,800	8.00	7.25
Limestone, ground	t	23	25.00	25.00
Fertilizer, commercial	lb	12,000	0.05	0.05
Seeding	lb	1,300	4.50	4.00
special formula	lb	450	6.00	5.00
Hedera helix, 2 yr	ea	16,250	0.30	0.29
Lonicera japonica halliana 2 yr	ea	2,000	0.50	0.25
Plantanus acerifolia				
cal 3″–3½″	ea	28	80.00	75.00
4″–5″	ea	84	125.00	120.00
5″–6″	ea	11	165.00	170.00
Quercus palustris				
cal 3″–3½″	ea	12	80.00	75.00
4″–5″	ea	65	115.00	125.00
5″–6″	ea	73	165.00	170.00
Quercus phellos, cal 4″–5″	ea	45	125.00	140.00
5″–6″	ea	38	175.00	200.00
CIP, soil 4″φ	lf	350	11.00	5.00
Inlets, drain, tp A	ea	4	160.00	400.00
tp B	ea	5	260.00	350.00
Fence, chain link exist,	lf	900	3.00	3.10
remove & reset paint	ls	job	1,000	1,500
Stanchions	ea	32	50.00	50.00
Sidewalk, city	sy	90	10.00	6.00
Storm water str, exist, alter	ls	job	12,000	8,000
Pipe sleeves, for utility lines under exist rdwy	ls	job	85,000	40,000

Plumbing—Lump Sum

1C	Astrove Plumbing & Heating Corp., Long Island City, N. Y.	$621,800
2	C. K. Rehner Inc., New York, N. Y,	629,400
9	A. Rosen & Son, New York, N. Y.	933,000
EE	Praeger-Kavanagh-Waterbury, New York, N. Y.	690,000

Heating & Ventilating—Lump Sum

1C	Alex C. Patterson & Sons, New York, N. Y.	$370,000
2	Taggert Corp., New York, N. Y.	376,000
7	Raisler Corp., New York, N. Y.	454,700
EE	Praeger-Kavanagh-Waterbury, New York, N. Y.	290,000

Elevators & Moving Stairs

1C	Otis Elevator Co., New York, N. Y.	$1,369,000
2	Peele Co., Brooklyn, N. Y.	1,434,195
EE	Praeger-Kavanagh-Waterbury, New York, N. Y.	1,280,000

Bids: 1-24-61 Items	Unit	Quantity	Unit Prices 1C	 2
Elevators #1 & 2	ls	job	$80,000	$90,000
Moving stairs 2 thru 8	ls	job	1,289,000	1,344,195

Electrical—Lump Sum

1C	Mager Elec. Co., Inc., Brooklyn, N. Y.	$1,798,000
2	L. E. Waldman & Co., Inc., Long Island City, N. Y.	1,800,000
13	Charles Michaels, Inc., Brooklyn, N. Y.	2,500,350
EE	Praeger-Kavanagh-Waterbury, New York, N. Y.	1,840,000

Liquidated damages: $100 per day
Completion date: 4-1-62

ENR Construction Cost Index (1913=100) 20-cities average—834.32

(Unit Prices cont. on page 99)

NEW Crawlmaster drill and Gyro-Flo compressor

...most versatile and powerful combination available for 4" to 6½" blast holes

THE INGERSOLL-RAND CRAWLMASTER is a multi-purpose blast-hole rig with extra weight and power for the toughest drilling jobs. This rugged machine is mounted on dozer-type crawlers with enclosed gear drive from two 11½-hp air motors, and interchangeable drill units permit percussion, rotary or Downhole drilling of 4″ to 6½″ holes at any angle from vertical to horizontal. Features include hydraulic feed and retraction, remote controlled reverse rotation, 30″ hydraulic leveling jacks and simple ejector-type dust collector.

Ample air power for all Drillmaster functions is provided by a 900-cfm Gyro-Flo rotary compressor—the last word in portable compressor economy and dependability. Simplicity of operation, freedom from maintenance, small size and light weight, air temperatures under 200°F, low oil consumption and closer regulation at all loads make Gyro-Flo the ideal running mate for the new Crawlmaster drill.

Ask your I-R distributor or engineer for complete information on the cost-saving Crawlmaster, Gyro-Flo combination.

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A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK

GYRO-FLO
Ingersoll-Rand

Wide Range Separates Bids For Oregon Sewer Addition

The town of Nyassa, Ore. awarded this $202,024 sewer addition job to two out-of-state firms. The work will increase sewage treatment facilities and extend sewer service to new areas.

The award for schedules 1 & 2, modifying the existing sewage treatment plant and pumping station and adding two new sewage pumping stations to the system, went to Babbitt Construction, Boise, Ida., for $87,177.

Although only three companies entered equipment bids, Babbitt's prices were consistently low, separating his total bid from the second low, Watkins Construction Co. of Boise, by 17%, and from the high by 30%. Cornell, Howland, Hayes & Merryfield, Boise, are the engineers on this project.

Better than half—57%—the cost of the new sewer system will go for schedule 3, supplying and placing 22,400 lf of sewer pipe. Hood Construction Co., Boise, took the contract with a low of $114,847, 11% under the second low, James G. Robertson Construction, Clackamas, Ore., and 61% short of the high of five bidders.

For trench excavation and backfill, classes B and C, Hood was well under the other four bidders. Bidding $1.44 a ft for 3,130 lf of 8-10 ft deep excavation (class B), Hood was from $0.66 to $2.06 low. Similarly, for 4,965 lf of class C, Hood's unit bid of $0.58 ranged from $0.57 to $1.42 under his competitor's bids.

Hourly wage rates including fringe benefits will be $2.98 for pipe layers, $3.84 for plumbers, and $2.75/hr for common labor.

The bidding included:

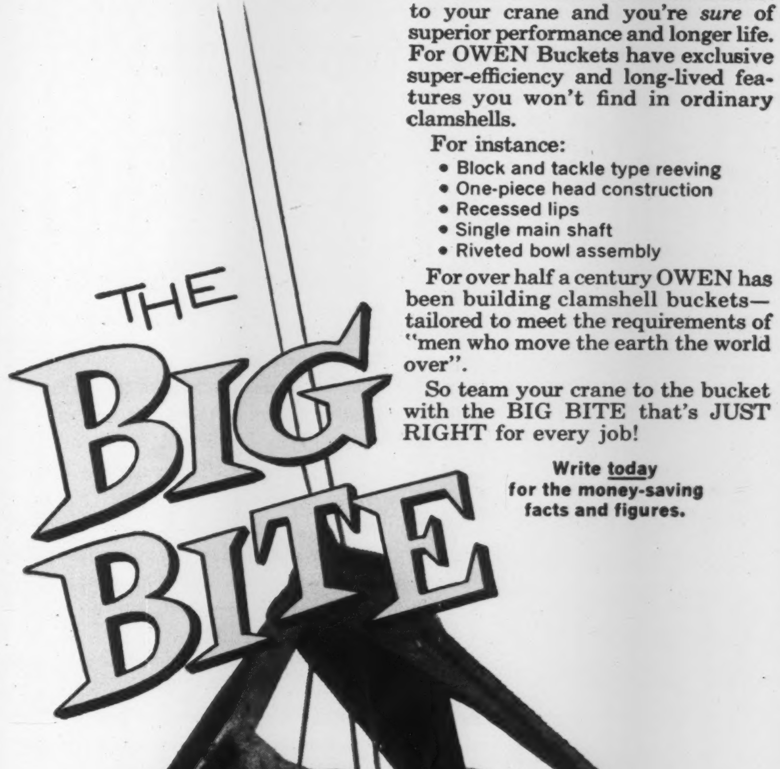
Schedules 1 & 2

1C	Babbitt Const., Boise, Ida	$87,177
2	Watkins Const. Co., Boise, Ida	101,690
3	M-K Co., Inc., Boise, Ida	113,632
EE	Cornell, Howland, Hayes & Merryfield, Corvallis, Ore	100,310

Schedule 1—Two Factory Built Prefabricated Pump Stations & Alterations to Existing Pump Station

Bids: 9-27-60 Items	Unit	Quantity	Unit Prices 1C	2
Pump Station 1, alternates				
Chicago Pump, tp UT	ea	1	$14,424	$17,360
Smith-Loveless	ea	1	14,833	17,740
Cornell	ea	1	12,943*	15,960
Schmieg	ea	1	14,378	17,320
Tex-Vet	ea	1	13,620	......
Yeomans	ea	1	......	......
Healy-Ruff	ea	1	......	......
King	ea	1	13,246	16,250
Zimmer & Francescon	ea	1	14,252	16,860
H.D. Fowler	ea	1	15,020	17,980
Chicago Pump-Flush-Kleen	ea	1	15,170	18,120
Pump Station 2, alternates				
Chicago Pump, tp UT	ea	1	14,933	17,570
Smith-Loveless	ea	1	15,876	18,460

(Continued on page 100)



Hook an OWEN Clamshell Bucket to your crane and you're *sure* of superior performance and longer life. For OWEN Buckets have exclusive super-efficiency and long-lived features you won't find in ordinary clamshells.

For instance:

- Block and tackle type reeving
- One-piece head construction
- Recessed lips
- Single main shaft
- Riveted bowl assembly

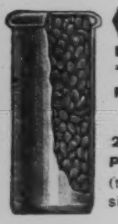
For over half a century OWEN has been building clamshell buckets—tailored to meet the requirements of "men who move the earth the world over".

So team your crane to the bucket with the BIG BITE that's JUST RIGHT for every job!

Write today for the money-saving facts and figures.

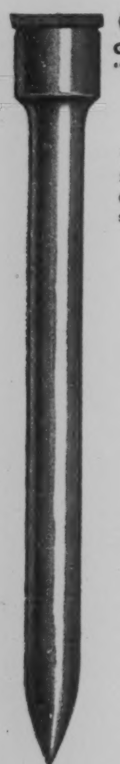
The OWEN
BUCKET COMPANY
BREAKWATER AVENUE • CLEVELAND 2, OHIO
BRANCH OFFICES: New York • Philadelphia • Chicago • Berkeley, California • Fort Lauderdale, Florida

Here's why any powder-actuated tool works better with Remington Loads and Studs



22 caliber Power Load (twice actual size)

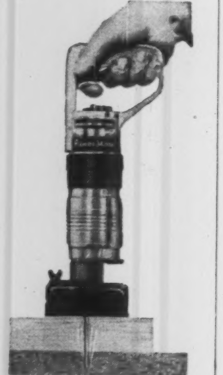
Scientifically graded Remington Power Loads offer precise, uniform charges . . . have strong, non-rusting brass cases. Exclusive "Kleanbore" priming mixture protects bore of tool because it does not cause rust or corrosion. No need to clean barrel after every job! These quality Power Loads are subjected to multiple inspection during manufacture, are backed by Remington—a name well known to American sportsmen. No matter what powder-actuated tool you use, it will work *better* with Remington Power Loads!



¼" S-25 Stud (twice actual size)

Uniform performance and penetration are assured with precision-made ¼" and ⅜" diameter Remington Studs. These high-strength studs are made with special molybdenum steel. Specify Remington Studs with exclusive green "Power-Guide" heads . . . for uniform performance and straight-driving penetration. Over 60 "job-rated" Studs to choose from—your assurance of a Remington "Power-Guide" Stud to fit every fastening application.

Remington know-how insures the quality of its Studs and Power Loads. No other company can offer the background of experience gained through the manufacture of billions of these units. When you order studs and loads, you'll get better performance if you specify Remington—maker of the most versatile fastening tool ever designed (right). We'll gladly send valuable free booklets about Remington Power Loads, Studs and fastening tools. Mail the coupon today!



Remington Model 455A Stud Driver

Remington

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Remington Arms Company, Inc., Bridgeport 2, Conn.
IN CANADA: Remington Arms of Canada Limited,
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ENR 31

Remington Arms Company, Inc., Bridgeport 2, Conn.
Please send—without obligation—catalogs on Remington Contractor & Industrial Tools checked:
☐Stud Drivers ☐Air Tools ☐Chain Saws
☐Concrete Vibrators ☐Flexible Shaft Machines
*Name*__________ *Position*__________
*Company*__________
*Address*__________
*City*__________ *Zone* ___ *State*__________

. . . Unit Prices

. . . Oregon sewer

Bids: 9-27-60 Items	Unit	Quantity	Unit Prices 1C	2
Pump Station 2, alternates				
Cornell	ea	1	13,754*	16,460
Schmieg	ea	1	14,584	17,240
Tex-Vet	ea	1	14,538	17,200
Yeomans	ea	1	......	......
Healy-Ruff	ea	1	......	......
King	ea	1	14,421	16,910
Zimmer & Francescon	ea	1	14,664	16,980
H.D. Fowler	ea	1	15,649	18,250
Chicago Pump-Flush-Kleen	ea	1	16,088	18,670
Alterations to existing Pump Station	ls	job	7,492*	7,800
* Sub Total, based on lowest priced alternates			$34,189	$40,220

Schedule 2—Additions & Alterations—Present Sewerage Treatment Plant

Base bid	ls	job	$38,969*	$46,700
Sludge Pump, alternates				
Chicago	ea	1	2,090*	2,100
Weinman	ea	1	......	......
Pacific	ea	1	......	......
Screening & shredding mech alternates				
Worthington	ea	1	4,231	4,240
Chicago-Barminutor tp C	ea	1	2,947*	2,960
Smith-Loveless	ea	1	4,582	4,570
Chicago Pump Co	ea	1	......	......
Clarifier mech alternates				
Dorr-Oliver	ea	1	5,834*	6,500
Process Engineers	ea	1	......	......
Walker Process	ea	1	......	8,080
Infilco	ea	1	......	......
Link Belt	ea	1	7,245	7,560
Chain Belt	ea	1	8,252	8,050
Eimco	ea	1	6,972	7,300
Chlorination equipment alternates				
Wallace & Tiernan	ea	1	2,191*	2,250
Supernatant Recirculation Pump alternates				
Fairbanks-Morse	ea	1	957.00*	960.00
Pacific	ea	1	996.00	1,000
Weinman	ea	1	......	......
* Sub Total, based on lowest priced alternates			$52,988	$61,470

Schedule 3—22,400 lf of Sewer Pipe in Place

1C	Hood Construction Co., Boise, Ida	$114,847
2	James G. Robertson Const., Clackamas, Ore.	127,465
5	Morrison-Knudsen Co., Inc., Boise, Ida	185,475
EE	Cornell, Howland, Hayes & Merryfield, Corvallis, Ore	127,616

Bids: 9-27-60 Items	Unit	Quantity	Unit Prices 1C	2
Exc & bf, cl B				
0-6′ deep	lf	5,200	$0.48	$0.90
6′-8′ deep	lf	3,130	0.64	1.50
8′-10′ deep	lf	740	1.44	2.10
10′-12′ deep	lf	980	2.35	3.00
12′-14′ deep	lf	845	3.00	4.00
14′-16′ deep	lf	1,040	3.82	6.00
Exc, tr & bf, cl C				
0-6′	lf	1,955	$0.42	$0.80
6′-8′ deep	lf	4,965	0.58	1.30
8′-10′ deep	lf	1,430	1.32	1.80
10′-12′ deep	lf	460	2.23	2.50
12′-14′ deep	lf	1,235	2.88	3.50
14′-16′ deep	lf	290	3.54	5.80
Fill over pipe	ls	job	336.00	200.00
Stabilization, fdn	cy	400	4.08	3.00
Crushed rock, base for pipe	lf	6,000	0.23	0.25
Pipe, conc, clay, or A-C				
std str, 6″	lf	350	1.44	1.70
8″	lf	9,595	1.84	1.80
class III, 18″	lf	1,462	6.44	6.50
asbestos-cmt				
class 1500, 6″	lf	300	1.43	1.70
8″	lf	5,780	2.02	1.80
class 2400, 8″	lf	3,470	2.65	2.60
10″	lf	1,435	2.76	3.00
Ftgs, conc, clay, or A-C Wye				
on 6″ pipe	ea	1	9.44	5.00
on 8″ pipe	ea	87	9.49	5.00
asbestos-cmt Wye				
on 6″ pipe	ea	3	9.48	5.00
on 8″ pipe	ea	42	10.68	5.00
on 10″ pipe	ea	2	13.58	10.00
MH, construction				
0-6′	ea	53	204.00	190.00
0-6′ single drop	ea	9	258.00	250.00
0-6′ double drop	ea	3	330.00	300.00

(Continued on page 102)

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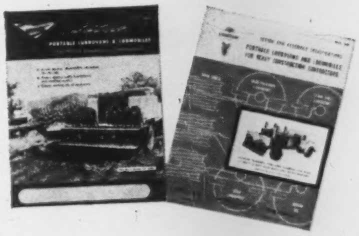

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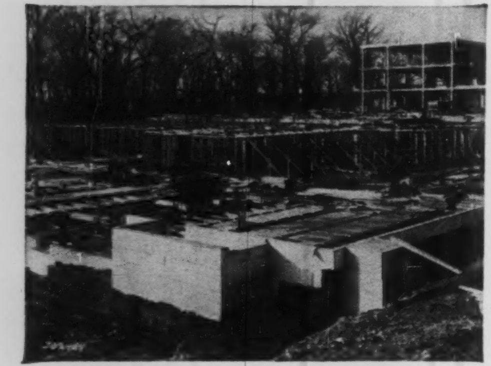

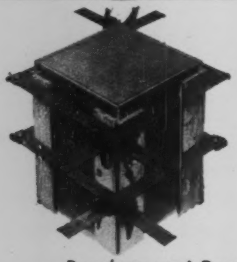

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The Pentagon is a Vacuum Concrete job

VACUUM CONCRETE CORPORATION of AMERICA
Girard Trust Building . . . Philadelphia 2, Penna.

. . . Oregon sewer

Bids: 9-27-60 Items	Unit	Quantity	Unit Prices 1C	 2
MH, construction				
add std, MH depth	lf	55	24.00	18.00
add single drop, MH depth	lf	70	36.00	22.00
add double drop, MH depth	lf	23	48.00	27.00
connect to exist MH	ea	3	156.00	100.00
plug abandoned pipe con in exist	ea	6	30.00	25.00
Gvl, street maintenance	cy	100	4.50	3.50
Rock, crushed, 1" minus				
base & leveling course,				
6" thk over 0-10' deep tr	lf	3,800	0.78	0.40
10'-16' deep tr	lf	150	1.04	1.00
surfacing				
4" thk over 0-10' deep tr	lf	3,940	0.48	0.35
10'-16' deep tr	lf	2,320	0.65	0.70
Bit pvt replacement				
2" thk over 0-10' deep tr	lf	1,780	1.08	1.50
10'-16' deep tr	lf	190	1.68	3.00
Conc, curb crossings	ea	2	$72.00	$25.00
encasement of sew pipe, 8" pipe	ls	job	140.00	150.00
18" pipe	ls	job	282.00	200.00
Highway crossing	ls	job	754.00	800.00
RR undercrossing	ls	job	1,505	4,750
Conc pipe, substitute for asbestos-cmt				
std str, 6"	lf	300	1.44	......
8"	lf	5,780	1.84	......
xtra str, 8"	lf	3,470	1.84	......
10"	lf	1,435	2.60	......

Total with conc pipe alt $110,724

ENR Construction Cost Index (1913=100) 20-cities average-830.92

Prestressing Takes Award For Alabama Underpass

By choosing a prestressed concrete deck alternate over structural steel, the city of Birmingham saved almost $121,000 on this contract for a street underpass beneath the Louisville and Nashville and Alabama Great Southern Railroad Co. track.

At a contract price of $871,707, Sullivan, Long & Hagerty, Bessemer, Ala., was low only 2.5% below the second low of Blount Bros. Construction Co., Montgomery, Ala., but 41% under the high of six. G. A. Heft & Co., New Orleans, are the engineers.

The underpass consists of a two-span structure supporting ten tracks and two 20-ft-wide passenger platforms crossing 19th St. at a 90-deg angle. The substructure consists of reinforced concrete abutments and center pier supported on H-section steel piles.

The superstructure will consist of prestressed concrete girders with poured concrete joints between girders. The deck provides a minimum vertical clearance of 14 ft 5⅝ in.

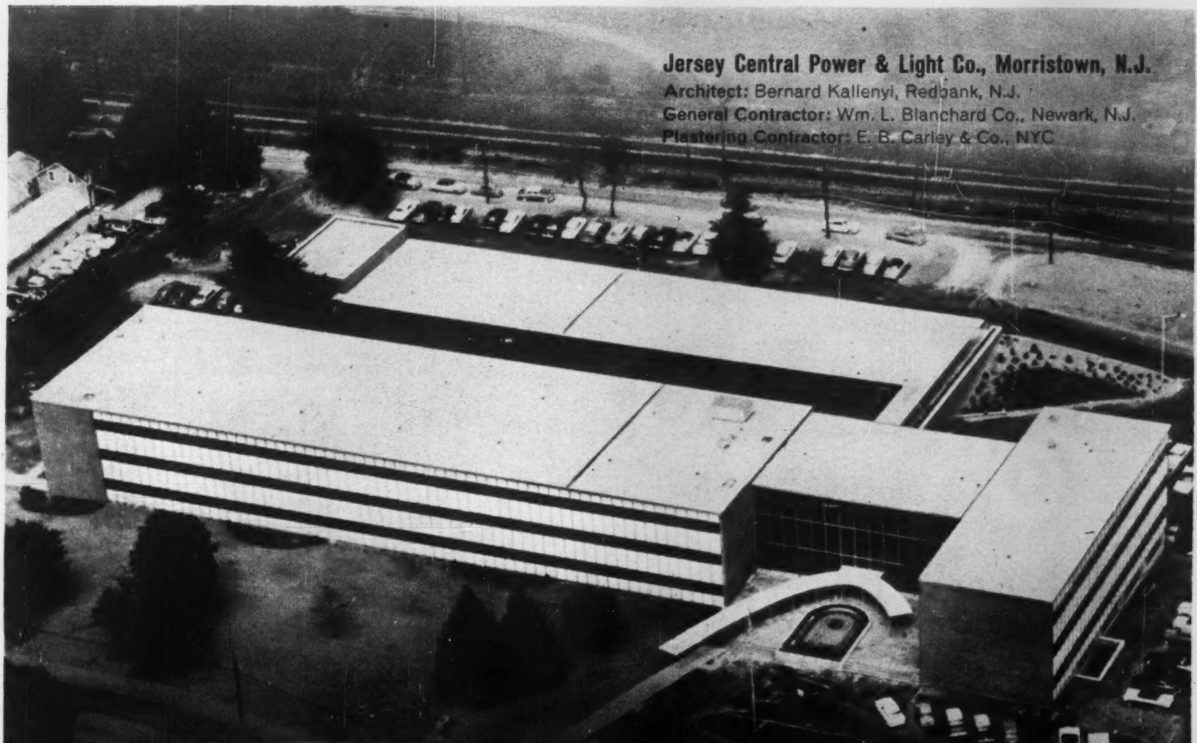
Wage rates include: common labor, $1.95/hr; bricklayer, $3.95; carpenter, $3.15; structural ironworker, $3.65.

The bidding included:

1C	Sullivan, Long & Hagerty, Bessemer, Ala.	$871,707
2	Blount Bros. Const. Co., Montgomery, Ala.	894,952
6	Harbert Const. Corp., Birmingham, Ala.	1,225,262

Bids: 1-23-61 Items	Unit	Quantity	Unit 1 C	Prices 2
Alternate 1-Prestressed Concrete Deck				
Conc, cl X, precast girders	cy	1,108	102.50	116.25
cip parapets, fascias & jts	cy	248	70.50	55.00
cip platforms, passengers	cy	262	76.00	82.00
Steel, reinf, deformed	lb	332,315	0.145	0.12
prestressing	ea	64	834.00	850.00
Drainage, deck	ea	38	190.0	150.00

(Continued on page 104)



Jersey Central Power & Light Co., Morristown, N.J.
Architect: Bernard Kallenyi, Redbank, N.J.
General Contractor: Wm. L. Blanchard Co., Newark, N.J.
Plastering Contractor: E. B. Carley & Co., NYC

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Exceptional savings can be realized in construction materials. Inches can often be cut off story height. Scaffold-handling is reduced to a minimum. High-speed application lets other trades go to work in the area days sooner. Also, you will want to investigate how Mono-Kote fireproofing thicknesses beyond building code requirements can provide extra savings in fire insurance rates.

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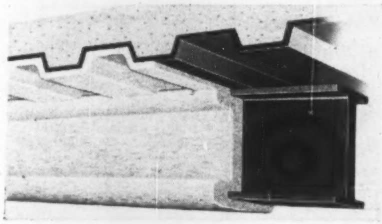
Phone or write your Zonolite Representative, or mail the coupon today.

New Mono-Kote sprays on direct to both deck and beam, adheres perfectly to steel without fall-out, withstands humidity and temperature changes.



ZONOLITE COMPANY, Dept. ENR-31
135 S. LaSalle St., Chicago 3, Illinois

☐ Send new Mono-Kote Bulletin PA-53, including fire test data.
☐ Have a Zonolite Representative contact me as soon as possible.
☐ I am interested in Mono-Kote for the following job:

Name:
Firm:
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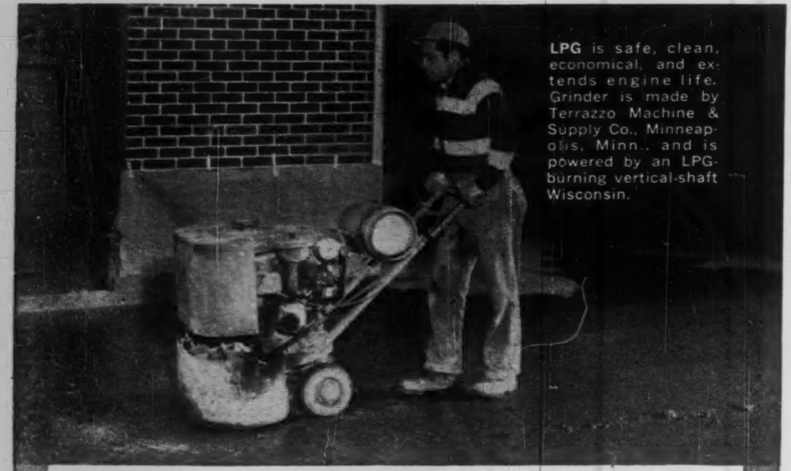

LPG is safe, clean, economical, and extends engine life. Grinder is made by Terrazzo Machine & Supply Co., Minneapolis, Minn., and is powered by an LPG-burning vertical-shaft Wisconsin.

cost less to use — and they're safer indoors

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If you operate indoors, you gain both safety and savings when you select equipment powered by LPG-burning air-cooled Wisconsin Engines.

You can save up to 15% on gas consumption alone. And because of the sealed fuel system, none is wasted — and none is lost through evaporation, spilling, or pilferage. Also, LPG combustion greatly reduces the percentage of dangerous carbon monoxide gas.

LPG burns clean. This leaves your engine free of gum, lead, and carbon deposits on pistons, rings, valves, guides, and spark plugs. Your engine lasts longer — and requires much less upkeep.

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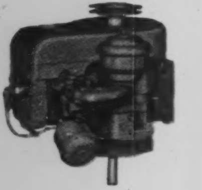

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CIRCLE 23 ON READER SERVICE CARD

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TUNNEL AND MINE EQUIPMENT
Lancaster, Penna.

CIRCLE 21 ON READER SERVICE CARD

. . . Alabama underpass

Bids: 1-23-61 Items	Unit	Quantity	Unit Prices 1 C	2
Downspouts, wrought iron, 5"ϕ	lf	230	19.00	11.00
Waterproofing, deck	sy	1,726	10.85	14.00
Girder bearings, prestr conc	ea	128	211.00	250.00
Alternate 2-Structural Steel Deck				
Conc, cl A	cy	147	76.00	75.00
cl D	cy	6	70.00	65.00
Steel, reinf, deformed	lb	30,017	0.12	0.13
Drainage, deck	ea	33	848.00	700.00
Downspouts, wrought iron, 4"ϕ	lf	333	16.25	8.00
Waterproofing, deck	sy	1,567	11.00	14.00
Steel, carbon, fabricated	lb	2,095,000	0.16	0.15
Girder bearings, str steel	ea	184	430,466	411,733
Items Applicable to Either Alternate				
Exc, common	cy	27,063	1.25	2.00
drainage	cy	960	7.59	3.75
rock	cy	180	38.50	17.00
borrow, truck measure	cy	2,500	3.16	4.00
str	cy	1,450	5.69	2.75
Piles, untreated tmbr	lf	4,760	3.75	1.79
steel, H section, 8BP36	lf	420	6.12	6.50
12BP74	lf	220	9.43	10.00
14BP102	lf	700	11.80	18.00
14BP117	lf	1,850	13.14	18.00
sheet, temp ret wall	sf	8,800	6.00	4.40
PCC pvt, 6" thick	sy	145	5.18	5.00
8" thick	sy	5,083	6.85	6.00
Conc curb, integral, 6" high	lf	486	2.21	0.90
10" high	lf	1,846	3.16	1.00
Parting strip, met	lf	3,482	0.76	0.60
Filler, expansion jt, premolded, 1" thick	sf	861	0.75	1.20
resilient, ¾" thick	sf	360	0.70	1.10
½" thick	sf	830	0.58	1.00
Filler, poured	t	1	1,225	830.00
Dowel assembly	lf	1,840	0.76	2.25
Reinf, fabric	lb	35,225	0.17	0.15
PCC walkwy 4" thick	sy	1,510	4.74	3.75
Conc curb & gut, combination	lf	205	3.60	3.50
PCC drivewys	sy	27	5.37	7.00
Conc, cl D	cy	1,778	49.78	60.00
cl X, substr	cy	131	70.44	100.00
Steel, reinf, deformed	lb	300,085	0.12	0.13
plain	lb	10,050	0.17	0.15
Macadam crs, stabilized	sy	1,900	2.85	2.75
Fdn, old, preparation	sy	820	1.58	1.25
Asp pvt, hot mix, wear crs, binder crs 1½"	sy	1,900	1.90	1.50
crs binder crs 5"	sy	820	4.55	4.00
wearing surface 2"	sy	145	2.53	2.00
Sumps, roadway	ea	2	1,896	2,400
Conc, storm sew, in place, 8"ϕ	lf	43	3.50	1.50
12"ϕ	lf	78	4.50	3.00
15"ϕ	lf	85	4.75	3.50
18"ϕ	lf	698	5.00	8.00
Pipe, removed, 4"ϕ	lf	68	2.00	0.75
6"ϕ	lf	468	2.00	0.75
8"ϕ	lf	15	3.00	0.80
12"ϕ	lf	120	3.00	1.00
13"ϕ	lf	75	3.00	3.50
14"ϕ	lf	175	3.00	3.00
15"ϕ	lf	126	3.00	3.00
18"ϕ	lf	120	3.00	3.50
MH,, build	ea	7	190.00	300.00
adjust	ea	5	88.00	60.00
removed	ea	2	126.00	50.00
Inlets, built, tp A	ea	2	233.00	200.00
tp G	ea	7	252.00	275.00
adjust	ea	1	126.00	60.00
removed	ea	11	63.00	80.00
CMP, culv, asph ctd, 8"ϕ	lf	662	6.00	5.75
perforated, 6"ϕ	lf	461	3.16	3.00
Lighting & wiring	ls	job	39,576	30,500
Pvt, old, remove	sy	2,720	0.50	1.20
Walk, old, remove	sy	621	0.63	1.00
Curb & gut, old combination, remove separate	lf	651	0.63	1.00
Railing, aluminum	lf	272	43.00	40.00
Armor, roadway	lb	2,544	0.48	0.40
Dampproofing	sy	2,020	1.15	1.20
Markers, project	ea	2	265.00	250.00
Tmbr, untreated	mfbm	56	316.00	500.00
Signs, detour	ea	4	25.00	200.00
Barricades	ea	4	12.00	200.00
Shed roofs, passenger platform, remove & re-erect	ls	job	21,381	25,000
Conc str, existing, remove	ls	job	38,311	20,000
Underpinning of east wall of Ala. Power Co. steam plant	ls	job	2,057	5,000
Portland cmt grout surface treatment	sy	25	6.83	5.00
Coal chute & bulkhead revisions, Ala. Power Co.	ls	job	2,447	1,000
Vault A, revisions	ls	job	3,226	1,000
Vault B, revisions	ls	job	582.00	1,000
Paving, special, integral curb & sidewalk, adjacent to Stallings bldg	ls	job	3,138	4,000
Retaining wall, met bin-tp	sf	1,180	7.00	9.00

ENR Construction Cost Index(1913 = 100)20-cities avera
—834.32

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THE TRAVELERS Insurance Companies HARTFORD 15, CONNECTICUT

CIRCLE 105 ON READER SERVICE CARD

Where Waterworks & Sewerage Dollars Go

Walter L. Picton, Director, Water and Sewerage Industry and Utilities Div., Business and Defense Services Adm., U. S. Department of Commerce

Estimated Capital Expenditure/Million Dollars

ITEM	Water Supply Total	Water Supply Treat plant	Water Supply Distrib & others	Sewage Disposal Total	Sewage Disposal Treat plant	Sewage Disposal Collect & others
			Thousands of Dollars			
Total	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Labor	**268.0**	**296.8**	**261.7**	**294.1**	**288.4**	**296.5**
Overhead, profit, equip and other	**160.7**	**161.4**	**160.6**	**189.4**	**178.3**	**194.2**
Supplies	**16.4**	**20.6**	**15.5**	**21.0**	**9.0**	**26.2**
Explosives	0.6	0.2	0.7	1.1	0.2	1.5
Fuels, (coal, coke, petroleum products)	10.3	9.6	10.5	9.7	5.1	11.7
All other, including small tools	5.5	10.8	4.3	10.2	3.7	13.0
Materials	**554.9**	**521.2**	**562.2**	**495.5**	**524.3**	**483.1**
Metal products	**301.3**	**146.4**	**335.0**	**120.0**	**116.2**	**121.6**
Bolts, nuts, washers, rivets	0.9	0.4	1.0	1.1	0.6	1.3
Castings, iron and steel	7.8	1.4	9.2	14.1	1.0	19.7
Forgings, iron and steel	0.2	0.7	0.1	0.4	1.0	0.1
Hardware	0.3	0.8	0.2	0.3	0.6	0.2
Hydrants and valves[1]	59.8	29.9	66.3	5.4	8.8	3.9
Lead	2.5	0.4	2.9	0.6	0.6	0.6
Metal doors	1.3	5.4	0.4	1.1	3.3	0.1
Nails and spikes	0.2	0.2	0.2	0.5	0.6	0.5
Pipe and fittings	183.4	55.3	211.3	23.0	32.1	19.1
Cast iron	114.2	136.7	131.1	15.9	18.9	14.7
Wrought iron and steel	50.9	17.5	58.2	4.3	8.7	2.4
Copper & other nonfer metals	18.3	1.1	22.0	2.8	4.5	2.0
Plumb fixt & supplies, excl pipe	1.2	5.8	0.2	1.1	1.4	0.9
Sheet metal	......	......	......	0.5	1.7	......
Steel reinforcing	8.3	26.1	4.4	42.8	35.8	45.8
Steel, structural	6.5	5.8	6.7	20.1	17.5	21.3
Tanks and towers	26.3	9.6	29.9	0.4	1.3	......
Wire and wirework products	......	......	......	1.8	1.8	1.8
Iron and steel products, n.e.c.	2.6	4.6	2.2	6.8	8.1	6.3
Machinery and equipment	**117.3**	**254.8**	**85.2**	**90.1**	**250.2**	**21.5**
Elect equip (motors, generators, apparatus)	5.1	7.2	4.6	6.3	13.6	3.1
Elect wiring devices and fixtures	5.5	21.8	2.0	4.6	11.0	1.9
Elevators & elevator equip	0.6	3.3	......	0.1	0.4	......
Heating & ventilating equip	1.9	5.8	1.0	1.9	5.4	0.4
Pumps & pumping equip, incl prime movers	23.0	75.8	11.5	32.7	77.6	13.5
Sewage waste treat equip	......	......	......	39.7	132.2	......
Water metals, regulators, gauges[2]	57.3	17.4	66.0	3.6	5.9	2.6
Water softening & treat equip[3]	21.8	121.9	......	......	......	......
Foundry & mach shop prods, n.e.c.	2.1	11.6	0.1	1.2	4.1	......
Stone, clay and glass products	**116.8**	**90.7**	**122.5**	**217.7**	**126.8**	**256.6**
Brick & hollow tile	5.3	8.8	4.5	9.6	12.7	8.3
Cement	7.6	23.9	4.0	60.1	56.8	61.5
Asbestos cement pipe	55.0	0.4	66.9	5.7	0.3	8.0
Clay pipe	0.4	1.9	0.1	30.0	4.6	40.8
Concrete pipe	39.0	28.4	41.3	60.0	7.9	82.3
Marble, granite, slate	0.9	2.8	0.5	0.5	1.7	......
Sand, gravel, crushed stone	7.5	21.9	4.4	50.1	40.5	54.2
Stone, clay & glass prod, n.e.c.	1.1	2.6	0.8	1.7	2.3	1.5
Lumber products	**5.8**	**10.2**	**4.8**	**23.8**	**19.7**	**25.6**
All other materials	**13.7**	**9.1**	**14.7**	**43.9**	**11.4**	**57.8**
Expansion joints (hemp, jute, & other joint compounds)	2.3	2.4	2.3	2.3	0.7	3.0
Paints and varnishes	1.1	1.6	1.0	0.9	2.7	0.1
Paving materials and mixtures	8.9	2.3	10.3	38.5	3.2	53.6
Roofing materials	0.8	2.2	0.5	0.2	0.3	......
Rubber products	0.6	0.6	0.6	0.5	1.6	......
Materials, n.e.c.	......	......	......	1.5	2.9	0.9

[1] Includes also butterfly valves, sluice gates, plug and cone valves, check valves, yard hydrants, and water service fittings. [2] Includes automatic valves and regulators. [3] Includes chlorinators and chemical dosing machines. [4] Includes supply impoundage, transmissions, storage. [5] Includes interceptors, pumping, and outfall lines.

Clay Pipe Prices Take Arizona Sewer Job

By underbidding three close competitors for vitrified clay pipe, Fike Plumbing & Heating Co., Phoenix, was able to take this $79,687 sanitary sewer award for $2,294, 2.8% under G. T. R. Construction Co., Inc., Tucson, second low, and only 5% below the high of four bidders.

Vitrified clay pipe accounts for about 49% of the cost of the project, and Fike was low for 6-in. and 4-in. sizes. For 1,272 ft of 6-in. clay pipe, Fike bid $1.40 a ft, $1.00 under the closest unit bid, and $1.60 under the high. Similiarly, for 4-in. pipe, Fike was $0.45 to $1.70 low with a bid of $1.30.

The sewer will go through an area of dry running sand at a 45-deg. angle of repose. The trenches will be 16 to 20 ft wide; depth will average 6 to 8 ft.

Minimum wage rates include: Bricklayer, $4.00/hr; carpenters, $3.775; laborers, $2.715.

The bidding included:

1C	Fike Plumbing & Heating Co., Phoenix, Ariz	$79,687
2	GTR Const, Co., Inc., Tucson, Ariz	81,982
4	Arrow Const. Co., Inc., Yuma, Ariz	84,051
EE	John A. Carollo, Phoenix, Ariz	85,116

Bids: 1-17-61 Items	Unit	Quantity	Unit Prices 1 C	Unit Prices 2
Exc	cy	8,600	$3.00	$3.30
VCP, 8"	lf	11,800	2.90	3.10
6"	lf	530	1.40	2.40
4"	lf	3,000	1.30	1.75
Wyes, vit clay, 8"x6"	ea	5	7.00	7.00
8"x4"	ea	280	7.00	7.00
6"x4"	ea	10	6.00	6.00
Bends ⅛ vit clay, 6"	ea	7	4.00	4.50
4"	ea	300	3.00	3.25
Saddles, vit, 6"	ea	2	3.00	10.00
4"	ea	16	6.00	8.00
MH, masonry, brick	lf	340	26.00	28.00
extra for drops	lf	40	15.00	18.00
frame & cover, CI	ea	44	50.00	55.00
Pvt, asb, replace, tp II	sy	25	6.00	14.00
tp III	sy	30	5.00	6.00

ENR Construction Cost Index (1913 = 100) 20-cities average — 834.32

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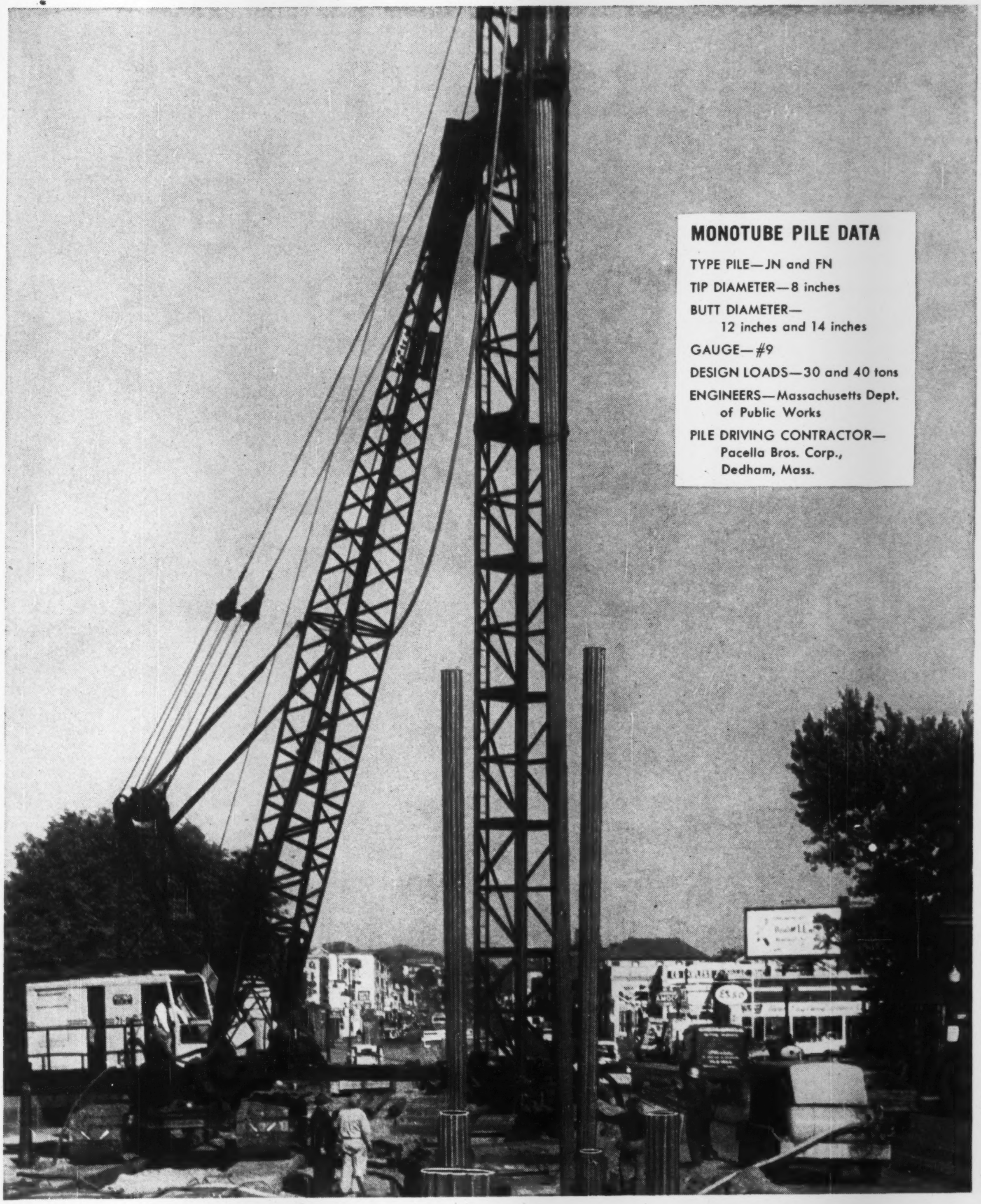
CIRCLE 106 ON READER SERVICE CARD



MONOTUBE PILE DATA

TYPE PILE—JN and FN

TIP DIAMETER—8 inches

BUTT DIAMETER—
12 inches and 14 inches

GAUGE—#9

DESIGN LOADS—30 and 40 tons

ENGINEERS—Massachusetts Dept. of Public Works

PILE DRIVING CONTRACTOR—
Pacella Bros. Corp.,
Dedham, Mass.

FAST-DRIVING MONOTUBE PILES PERMIT NORMAL TRAFFIC FLOW along side this 96″ diameter storm sewer project in Worcester, Mass. Easy handling and rapid installation using light, mobile equipment make Monotube foundation piles ideal for this type of project.

Tapered, fluted Monotube piles are available in lengths, diameters and gauges to meet every requirement. The Union Metal Manufacturing Co., Canton 5, Ohio — Brampton, Ont., Canada.

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Monotube Foundation Piles

CIRCLE 107 ON READER SERVICE CARD

CIRCLE 108 ON READER SERVICE CARD→

Gulf® products and service help V. N. Green on 4-million cubic yard excavation job...

The hills around Charleston, W.Va., present no easy task when it comes to building highways. Valleys, steep slopes, meandering creeks, soft shale and plenty of hard rock mean peak performance from equipment is a must.

When V. N. Green and Company, Inc., Charleston, W. Va., started a 2.8-mile stretch of Interstate 77, they planned ahead to assure peak equipment performance. Example: central fuel storage with underground tanks on the job site. These tanks were used to store 12,000 gallons of Gulf Dieselect® fuel and 4,000 gallons of Good Gulf® gasoline.

"With 60 pieces of equipment working 20 hours a day, we averaged 32,000 cubic yards of earth and rock each day," said Harry Staples, Maintenance Superintendent. "You don't worry about fuel until you see what it takes to keep that much equipment going 20 hours a day," he continued. "That's where our underground storage tanks came in handy. And thanks to good Gulf service our fuel supply never even ran low. Furthermore, our gasoline and diesel engines delivered top power and performance."

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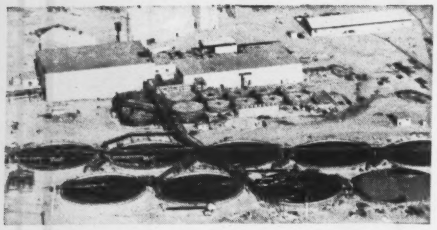

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Steel supports to stop cave-ins in third . . .

California Highway Tunnel

Caldecott tunnel will be the third for the Berkeley Hills low-level highway, a 3,000 ft long tunnel for the California Department of Public Works, Division of Highways.

The construction contract for the project was awarded to Connolly, Grafe, Brayer & Harney, San Francisco, for $10,378,333, 6.7% below Caldecott Tunnel Constructors of Burlingame, Calif., second low, and 42% under the high of nine bidders.

The new tunnel will be much larger than the two existing bores. Going through sandstone, shale, chert, and great numbers of soft dikes, both of the original tunnels were plagued with serious cave-ins during construction. In Caldecott, structural steel will be used for most of the temporary tunnel supports, paid for as a contract item, and concrete lining will be placed as close as practical to the front face of tunnel excavation.

Tunnel lining, which involved 52,450 cu yd of class A concrete, drew bids ranging from the low's bid of $20.00 a cu yd, to a high of $53.40. The bid submitted by Connolly, Grafe, Brayer & Harney's was $9.50 or 32% under the second closest cu yd price.

Tunnel excavation also contributed to the successful bid for 182,350 cu yds of tunnel excavation. At just $19.20 a cu yd, Connolly, Grafe, Brayer & Harney were $1.25, or 6% under the second low, and $11.90 or 38% below the high.

This third bore will be about 500 ft below the summit of the ridge, and 150 ft north of the existing northerly tunnel. It will be on a 4 percent grade descending from the Orinda end of the tunnel down toward Oakland, and both ends will be on curves, providing smooth alignment into the canyons at each end.

In order to carry the heavy volume of fast moving traffic now using the too narrow 22-ft roadways of the other two tunnels, the new tunnel will have 28-ft roadways. It will also have a 4-ft sidewalk on the right of traffic and a 2½-ft curb on the left. Vertical clearance will be 17-ft.

The transverse system of ventilation will be used to ventilate the new tunnel. About one-half million cubic feet of fresh air a minute, through ceiling openings on 15-ft centers, will be blown down one side of the tunnel to clear the roadway section, and exhaust gases will be sucked into the exhaust duct through ceiling openings on the other side.

Basic wage rates include: carpenter, $3.63-$3.725/hr; bricklayer, $4.15; cement mason, $3.77; electrician, $4.38; blaster, powderman, $3.52; limber, brush loader and piler, $3.045; and laborer, $3.045/hr.

The bidding included:

1C	Connolly, Grafe, Brayer & Harney, San Francisco, Calif.	$10,378,333
2	Caldecott Tunnel Constrs., Burlingame, Calif.	11,069,412
9	MacLean-Grove & Co., Inc., Grove, Sheperd, Wilson & Kruge, Inc., & Johnson, Drake, Piper, Inc., New York, N. Y.	14,747,364

Bids: 11-16-60 Items	Unit	Quantity	Unit Prices 1 C	2
Conc, remove	cy	48	$50.00	$60.00
Clear & grub	ls	job	335,000	160,000
Water supply, develop	ls	job	250,000	100,000
apply	Mgal	17,300	0.10	0.10
Binder, dust palliative	t	10	65.00	63.00
Exc, roadway	cy	396,000	0.95	0.90
trench	cy	12,300	1.10	0.90
tunnel	cy	182,350	19.20	26.90
str	cy	6,400	3.00	3.75
portal	cy	7,600	7.00	2.60
Bf, str	cy	4,700	6.50	3.50
portal	cy	1,320	6.00	4.50
Exc, str, bri	cy	1,885	3.00	3.80
Bf, str, bri	cy	4,360	8.50	3.80
Exc, ditch	cy	930	3.00	2.10
Fertilizer, commercial	lb	4,900	0.11	0.10
Seed	lb	2,400	0.30	0.35
Roadway, finish	ls	job	2,000	5,400
Subbase mat, pervious	t	430	4.80	3.80
aggr, cl 2	t	13,200	2.60	2.10
Aggr, base, cl 3	t	6,000	4.00	3.80
plant mix cmt treated. base, cl A	t	1,140	5.00	2.90
cl B	t	5,900	4.00	2.90
Asph, liquid, curing seal, MC-2	t	18	60.00	50.00
emulsion, seal coat & paint binder	t	5	75.00	54.00
fog seal coat	t	3	65.00	57.00
Screenings	t	50	10.00	8.00
Aggr, tp B asph conc	t	4,090	8.50	7.50
Asph conc, pvt	t	210	8.50	7.50
dikes, place	lf	1,300	0.35	0.50
misc areas, place	sy	100	1.50	1.60
Portland cmt, pvt & base	bbl	4,520	4.50	4.30
grouting	bbl	2,500	15.50	45.00
Conc pvt, 0.83′ thick	sy	9,205	4.50	3.90
Jts, plane, transverse, saw weakened	lf	5,520	0.25	0.25
Tie bars	ea	1,490	0.70	0.50
Piling, conc, furnish	lf	6,170	3.80	3.90
conc drive	ea	275	90.00	85.00
conc, cast-in-drilled hole	lf	1,260	11.00	8.00
Conc, cl A, minor str	cy	65	160.00	110.00
ceiling & part	cy	3,000	65.00	68.00
bri	cy	2,920	56.00	75.00
tunnel lining	cy	52,450	20.00	29.50
portal	cy	2,050	85.00	97.00
cl C, backfill	cy	100	30.00	31.00
Waterstops, rubber	lf	9,130	4.00	2.70
Pipe, grout	ea	660	13.00	6.00
Drilling, grout pipes & weepers	lf	3,200	3.00	1.50
exploratory holes	lf	1,250	6.00	2.60
Steel, reinf, bar	lb	24,000	0.12	0.15
bri	lb	1,020,000	0.105	0.13
tunnel	lb	2,320,000	0.11	0.12
Mesh, reinf, 4″x4″, 14 gage	sy	640	0.60	0.45
Mortar, air-blown	cy	54	51.00	80.00
Waterproofing, membrane	sy	895	4.50	4.50
Steel, perm tunnel supports	lb	5,100,000	0.25	0.146
Weepers & drain 3″	ea	332	140.00	150.00
Metal, misc, bri	lb	5,200	0.50	0.60
tunnel	lb	81,000	0.70	0.35
portal	lb	13,200	0.55	0.60
Painting, under tunnel ent louvers	ls	job	3,500	1,750
Tunnel, prepare for tiling	sf	222,000	0.07	0.11
Tile, tunnel, 4¼″x4¼″	sf	222,000	1.75	1.95
RCP cl III, 18″	lf	292	4.50	4.40
30″	lf	610	9.00	9.50
42″	lf	1,390	16.50	15.00

(Continued on page 112)

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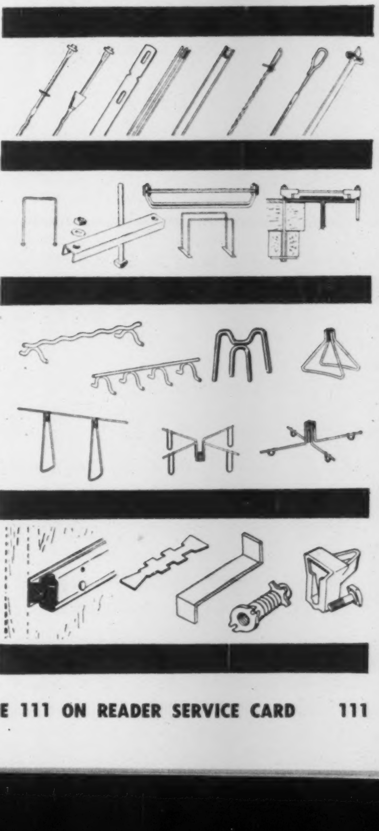

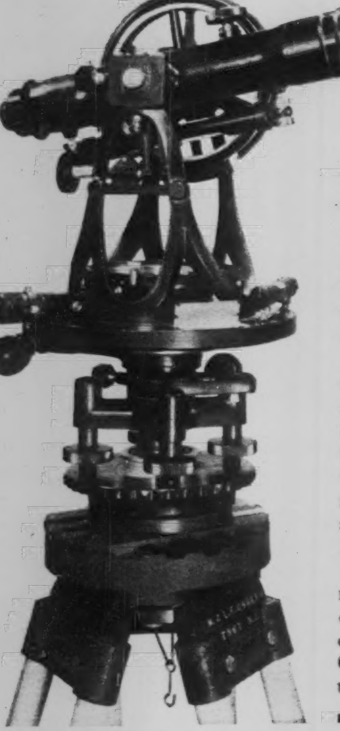

A Guide to OP and VP

Gurley Optical Plummet

The Optical Plummet Transit opens new avenues in accuracy, speed and convenience…eliminates inconvenience and lost time involved in centering a plummet over a point.

The Optical Plummet is a telescope through the vertical center (spindle) of a transit. It will point vertically when the transit plate is level. The telescope is turned at right angles by a prism, so that vision is actually horizontal. Setting and adjustment may be checked very simply and precisely by rotating the instrument 180 degrees.

The Gurley Shifting Head Tripod permits 1¾" movement of the transit in two directions 90° separated, without material disturbance to the level of the plate (the Optical Plummet thus remains operative through the entire centering procedure).

Advantages of the Gurley Optical Plummet Transit

- Saving in set-up time, as much as 33%—a factor when a crew is waiting.
- Eliminates swaying plumb bob.
- More accurate centering over point.
- On construction work—sights on points some distance below, such as encountered in bridge work and building construction.
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Gurley Optical Plummet Transits Available in 21 Combinations

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OP-62	—	OP-67
OP-132	OP TC 137	OP-137

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Variable Power is standard on Gurley Transits and Levels:

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- Easily adjusts to suit weather and light conditions
- Built-in haze filter

At high power:
- longer shots
- less glare in bright sunlight
- increase in readability
- no glare…high contrast
- blacks and whites stand out

At low power:
- greater field
- brighter field
- decrease of heat waves

We will be pleased to send you further information about both Gurley Optical Plummet Transits and Gurley Variable Power Eyepiece.

Both Optical Plummet and Variable Power are patented.

W. & L. E. Gurley • Union Plaza, Troy, N. Y.

. . . Highway tunnel

Bids: 11-16-60 Items	Unit	Quantity	Unit Prices 1 C	2
RCP cl IV, jacked, 42"	lf	72	70.00	50.00
Collector, reinf conc, 18"	lf	3,400	23.00	13.50
CMP, bit ctd, 16 gage, 12"	lf	430	3.50	3.25
18"	lf	650	3.50	4.40
14 gage, 24"	lf	440	8.00	7.00
12 gage, 24"	lf	164	10.00	7.50
10 gage, 30"	lf	2,400	15.00	9.00
12 gage, 36"	lf	710	15.00	14.00
Drain facilities, modify existing	ls	job	3,000	1,250
PMP bit ctd, underdrain 16 gage, 8"	lf	3,250	2.50	2.25
Filter mat, tp C	t	3,640	4.20	3.80
PMP bit ctd, underdrain asb bond, 14 gage, 8"	lf	12,450	11.50	4.90
Inlets, corr met, drop, 36"	lf	380	32.00	24.00
prec conc, drop, 36"	lf	45	20.00	30.00
Iron & steel, misc	lb	7,200	0.50	0.50
Entrance str	ls	job	1,200	540.00
Debris deflectors	ls	job	700.00	615.00
Septic tank & leaching fld.	ls	job	7,500	2,050
Conc, cl B, curb & sidewlk	cy	1,574	38.00	31.00
Fence, chain link, tp CL-6	lf	2,400	1.70	1.70
Rail, met beam guard	lf	1,500	3.60	3.50
barrier, tp 2	lf	852	11.00	10.00
tp 5	lf	619	13.50	11.25
Lighting sys, highway	ls	job	4,000	41,040
tunnel	ls	job	290,000	[illegible]18,000
Operating sys, tunnel	ls	job	480,000	450,000
Cross adit, tunnel	lf	357	215.00	260.00
Portal bldg, misc items	ls	job	45,000	18,000
Light control, exist, louver revisions	ls	job	20,000	3,250

ENR Construction Cost Index (1913 = 100) 20-cities average—830.09

Concrete Takes One-Third Of Irrigation Job Cost

The Bureau of Reclamation awarded this $925,354 irrigation system rehabilitation contract to E. & M. Bohuskey Construction Co., Harlingen, Tex., at a price 3.5% under the second low, H. B. Zachry Co., San Antonio. The high of five bidders was 18% above the low. Work is for the Bureau of Reclamation, Lower Rio Grande Rehabilitation Project, Mercedes Division. Leonard E. Weckerling is the project construction engineer for the Bureau.

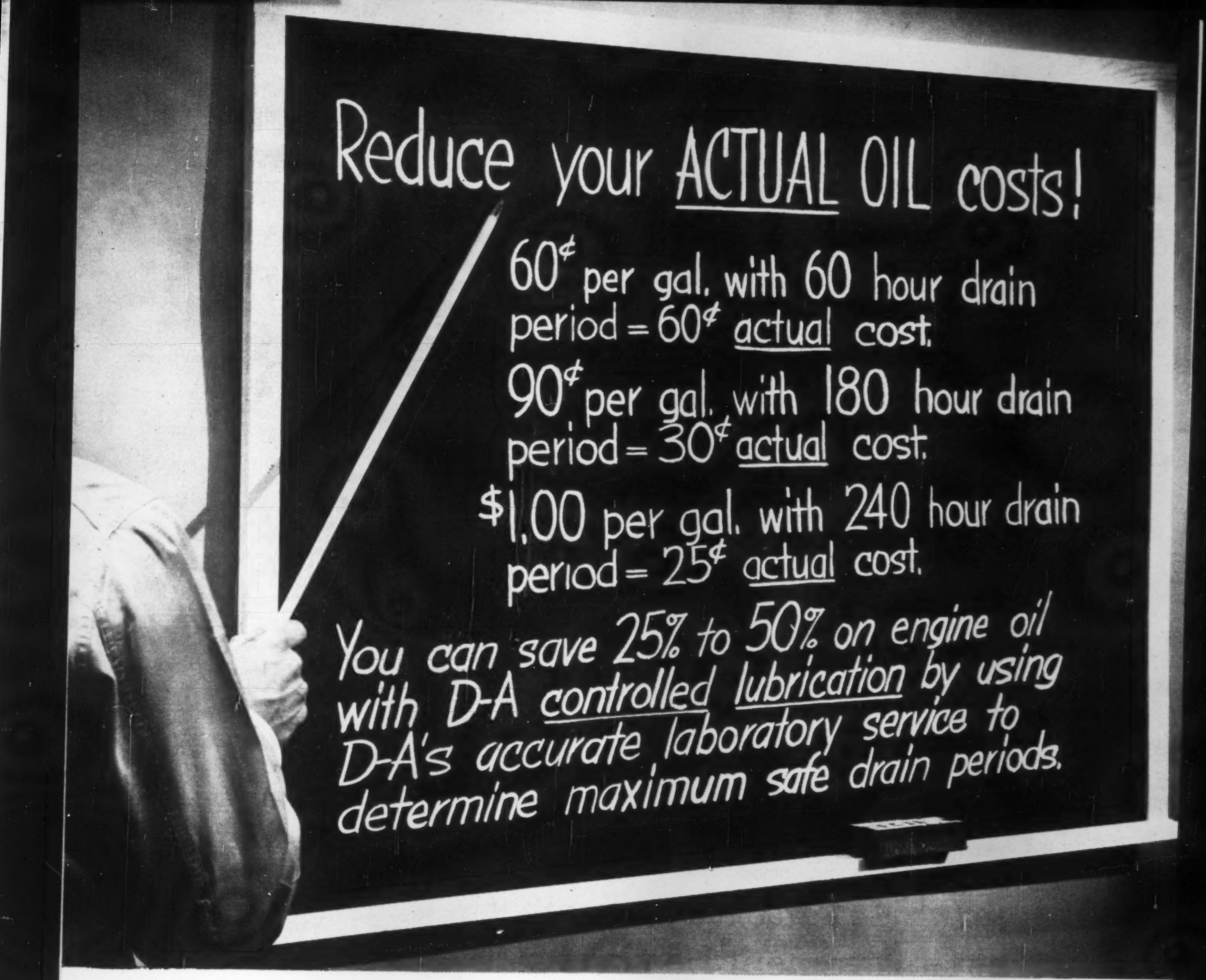
Concrete for lining about 15.5 miles of laterals took a sizable bite of the total cost, accounting for 29% of the contract price. Unit prices for this 12,150 cu yd of concrete ranged from $20 to a high of $23.40, with Bohuskey's unit bid $1.90 above the low.

In addition to 15.5 miles of concrete lateral lining with 5- and 3-ft bottom widths, the contractor will provide earthwork for construction of compacted and uncompacted embankment for the 15.5-mile section.

Other items of construction include 116 farm turnouts, eight concrete pipe road siphons with concrete inlet and outlet transition structures, five concrete pipe drainage structures and three wasteway structures; five existing road siphons, and two existing drainage structures will be modified.

The schedule of minimum hourly wage rates includes: common labor,

(*Continued on page 114*)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CIRCLE 113 ON READER SERVICE CARD

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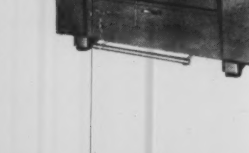


CIRCLE 114 ON READER SERVICE CARD

. . . Texas irrigation

$1.00; pipe layer, $1.15; roller operator, $1.30; tractor operator, $1.10, 80 hp or less; single axle truck driver, $1.00/hr.

The bidding included:

1C	E. & M. Bohuskey Const. Co., Harlingen, Tex.	$925,354
2	H. B. Zachry Co., San Antonio, Tex.	956,574
5	Cosmo Const. Co., Houston, Tex.	1,124,757
EE	Bureau of Reclamation	997,278

Bids: 9-22-60 Items	Unit	Quantity	Unit Prices 1C	 2
Clear & grub	ls	job	$44,061	$72,000
Embankment,				
construct from source A mat	cy	543,000	0.47	0.40
construct from source B mat	cy	121,200	0.47	0.54
compacting	cy	310,300	0.10	0.10
Conc protection, broken	cy	40	27.00	10.00
Fdn, earth, trim for conc lining	sy	175,000	0.325	0.35
Conc, in lateral lining	cy	12,150	21.90	23.00
in structures	cy	200	70.00	80.00
Cmt, f & handling	bbl	18,520	4.82	4.40
Bars, reinforcement	lb	14,400	0.13	0.15
Fill mat, elastic, in jts				
½"	sf	90	4.00	3.00
1"	sf	400	5.00	4.00
Str & lateral lining, existing, remove	ls	job	6,805	20,000
Pump & well, existing, relocate	ls	job	250.00	600.00
Inlets, turnout, a	ea	18	175.00	425.00
b	ea	6	300.00	375.00
c	ea	3	175.00	320.00
d	ea	1	230.00	550.00
e	ea	12	162.00	340.00
f	ea	2	170.00	350.00
g	ea	1	180.00	530.00
h	ea	7	182.00	290.00
i	ea	1	225.00	350.00
j	ea	1	172.00	420.00
k	ea	6	175.00	270.00
l	ea	3	165.00	330.00
m	ea	24	158.00	250.00
n	ea	2	190.00	330.00
o	ea	23	170.00	220.00
p	ea	4	180.00	220.00
q	ea	2	165.00	270.00
CMP, 14 ga, 30" φ	lf	92	12.25	11.00
12 ga, 15" φ	lf	294	7.50	7.00
Conc, irrigation pipe w/tp A jts, 14" φ	lf	2,160	2.64	3.00
16" φ	lf	140	2.95	4.00
pressure pipe, unreinforced w/rubber-gasket tp R jts, 18" φ	lf	174	5.30	4.00
21" φ	lf	58	6.00	5.00
24" φ	lf	114	6.92	6.00
30" φ	lf	338	8.70	8.00
culv pipe, w/rubber-gasket tp R jts, cl III, 15" φ	lf	16	4.48	5.00
24" φ	lf	164	6.65	8.00
30" φ	lf	122	8.70	9.00
36" φ	lf	242	12.00	12.00
42" φ	lf	84	19.00	17.00
48" φ	lf	174	21.00	19.00
54" φ	lf	180	30.00	25.00
60" φ	lf	294	32.00	28.00
cl IV, 24" φ	lf	136	8.90	8.50
36" φ	lf	74	14.00	15.00
culv pipe w/tp R jts, laying only, 60" φ	lf	210	12.00	7.00
culv pipe cl III, w/rubber-gasket tp F or tp R jts	lf	146	42.00	39.00
Tee, fab only, 15" x 18"	ea	1	51.00	60.00
14" x 18"	ea	1	51.00	60.00
Conc irrigation pipe, for drain crossing piers, 16" φ	lf	104	4.00	2.00
Tmbr gates, slide,				
3' 4" x 2' 8⅝"	ea	5	269.00	250.00
3' 4" x 2' 9"	ea	1	276.00	250.00
3' 6½" x 3' 9¾"	ea	2	277.00	300.00
3' 6½" x 3' 8½"	ea	2	288.00	300.00
3' 6½" x 3' 8⅞"	ea	2	290.00	300.00
4' 5" x 3' 3¼"	ea	4	375.00	350.00
4' 6" x 7'	ea	2	830.00	900.00
5' 6" x 6'	ea	2	830.00	900.00
5' 4" x 3' 3¾"	ea	1	345.00	400.00
Cast-iron slide gate,				
14" φ	ea	83	86.00	70.00
16" φ	ea	5	97.00	80.00
18" φ	ea	6	128.00	100.00
21" φ	ea	3	147.50	130.00
24" φ	ea	5	177.00	140.00
30" φ	ea	12	260.00	250.00
36" φ	ea	1	450.00	400.00
48" φ	ea	2	900.00	650.00
Vlv, gate, GV5, 12"	ea	1	300.00	350.00
18"	ea	1	440.00	500.00
Metalwork, misc	lb	2,900	1.00	0.80

ENR Construction Cost Index (1913=100) 20-cities average—830.92

JOISTOLOGY*

HAS HELPED BUILD MORE SCHOOLS FOR AMERICA

***joist-ol'o-gy, n.** (As Webster *should have* defined it) The art or science of designing and building more economical structures through the use of open web steel joists.

Architects, engineers and school officials throughout the country have found that all types of school buildings—single or multi-story—can be constructed more efficiently and economically through the use of steel joist floors and roofs.

Steel joists have been used in more school buildings than any other type of construction, because of low material cost and equally economical placing and handling costs experienced with these all-purpose structural members—light in weight but long in span and adaptability.

The continued specification of steel joists in school buildings will help make possible the completion of many critically needed school structures within the budget of the community.

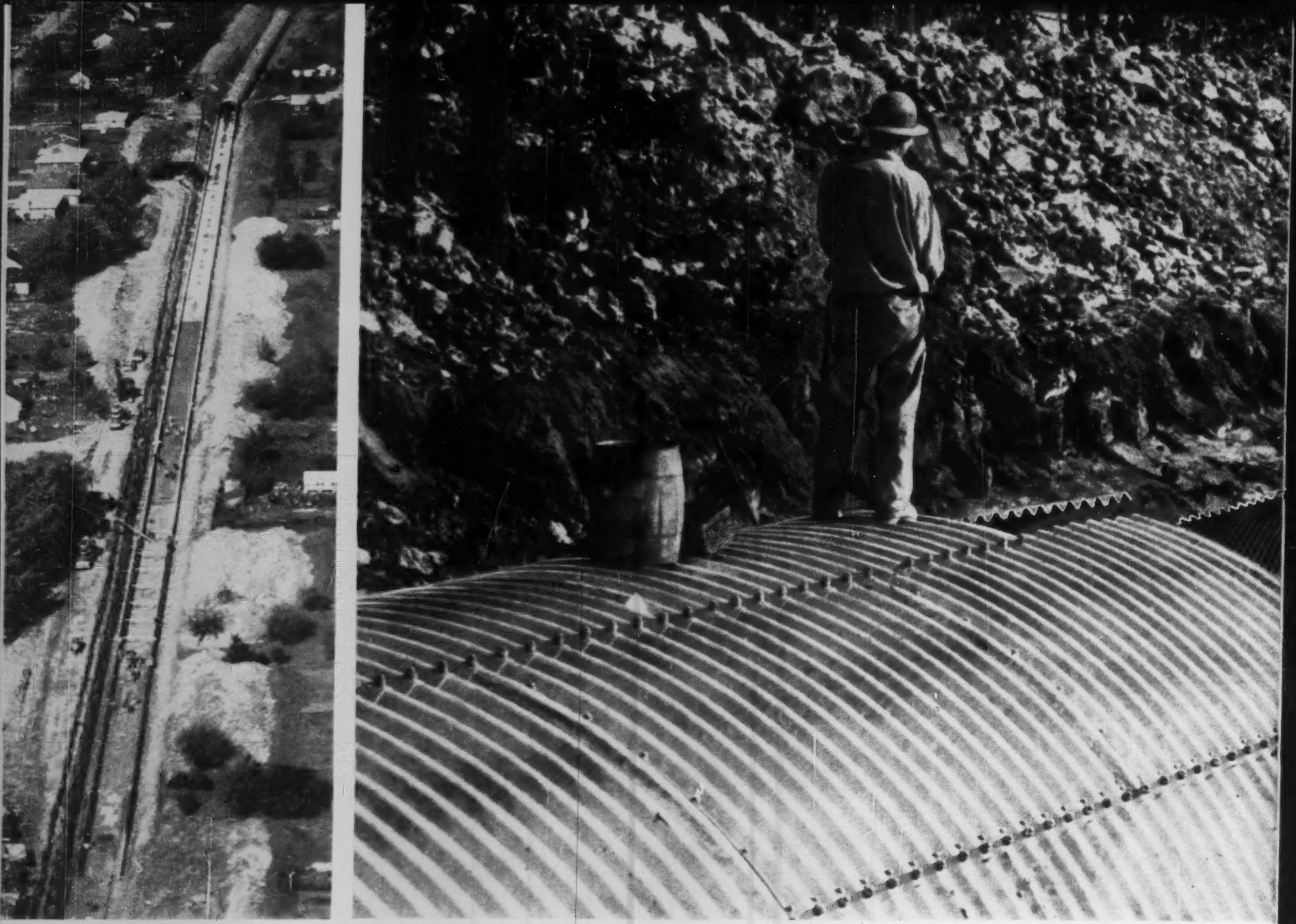
The Steel Joist Institute has published helpful technical literature including the specifications and load tables for open web steel joists and their application for floors and roofs. The Institute will be happy to send you this material upon request at no charge.

6104

Another in a series of advertisements placed in the public interest by the
Steel Joist Institute, 1346 Connecticut Ave., N.W., Washington 6, D.C.

CIRCLE 115 ON READER SERVICE CARD

6006



This mile-long culvert puts storms in their place

Storm water will run through this mile-long culvert and not through the backyards of residents of Warren, Michigan. Serving as the Bear Creek Inter-County Drain, this giant sectional plate structure is built of 880 tons of USS AmBridge Sectional Plate Arches and Pipe Arches. Spans vary from 14 to 24 feet, and rises range from 8 feet to 11 feet. Greenfield Construction Co., Detroit, was the prime contractor. Sectional Plate was fabricated and erected by American Bridge. ☐ USS AmBridge Sectional Plate is strong . . . won't crack or break. Sections are prefabricated from tough, zinc-coated corrugated steel. They're highly corrosion resistant and simple and inexpensive to assemble. Installation is fast because forms aren't used. No need to wait out costly curing time. USS AmBridge Sectional Plate is available in a complete range of sizes and is fabricated to meet all federal and state specifications. American Bridge Highway Products are designed to add speed, strength, and permanence to highway and drainage programs. Contact one of our offices for literature and information on American Bridge Highway Products.

USS, American, AmBridge and I-Beam-Lok are registered trademarks

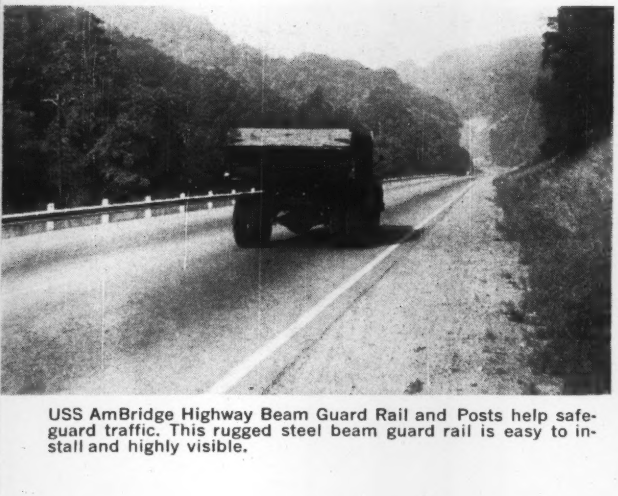
General Offices: 525 William Penn Place, Pittsburgh, Pa. Contracting Offices in: Ambridge
Atlanta • Baltimore • Birmingham • Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver
Detroit • Elmira • Gary • Harrisburg, Pa. • Houston • Los Angeles • Memphis • Minneapolis
New York • Orange, Texas • Philadelphia • Pittsburgh • Portland, Ore. • Roanoke • St. Louis
San Francisco • Trenton • United States Steel Export Company, New York

American Bridge
Division of
United States Steel

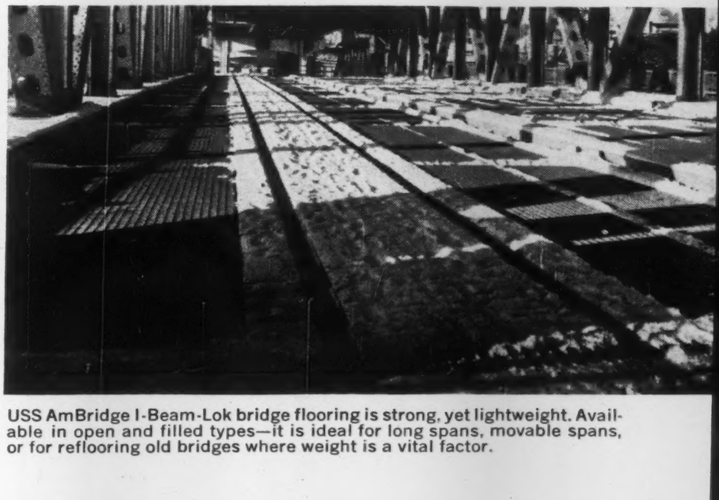
Designed by Johnson and Anderson, Engineers

General Contractor: Greenfield Construction Co.

This mark tells you a product is made of modern, dependable Steel.

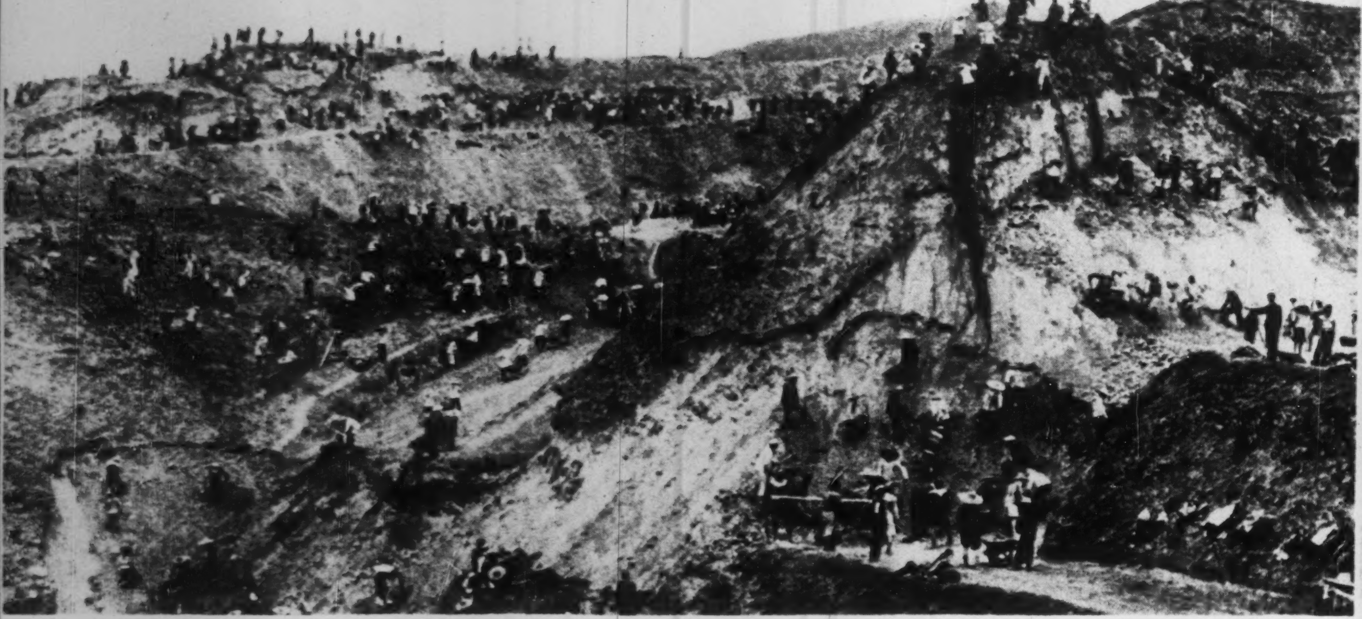


USS AmBridge Highway Beam Guard Rail and Posts help safeguard traffic. This rugged steel beam guard rail is easy to install and highly visible.



USS AmBridge I-Beam-Lok bridge flooring is strong, yet lightweight. Available in open and filled types—it is ideal for long spans, movable spans, or for reflooring old bridges where weight is a vital factor.

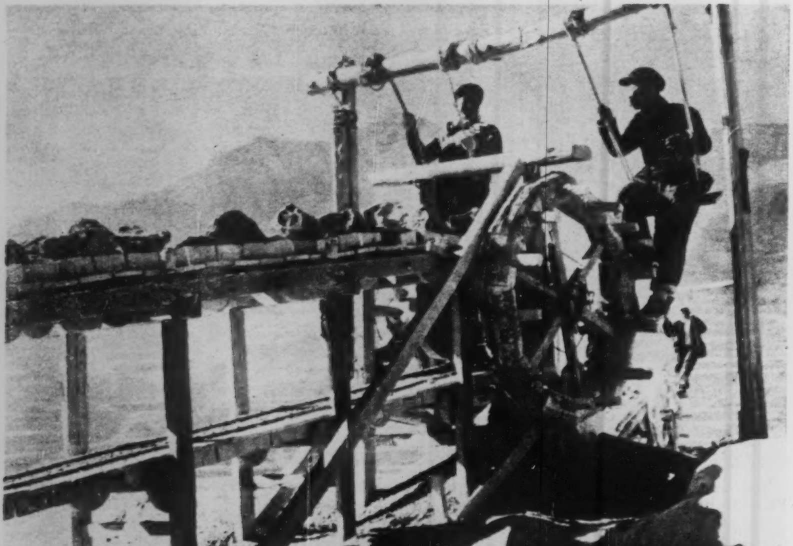
CIRCLE 117 ON READER SERVICE CARD



Not a machine is in sight, but there's manpower galore as Red Chinese coolies build 684-mile-long

An ENR Picture Report:

Red China Construction Is Mostly



Ingenious wooden conveyor has two-manpower "engine."

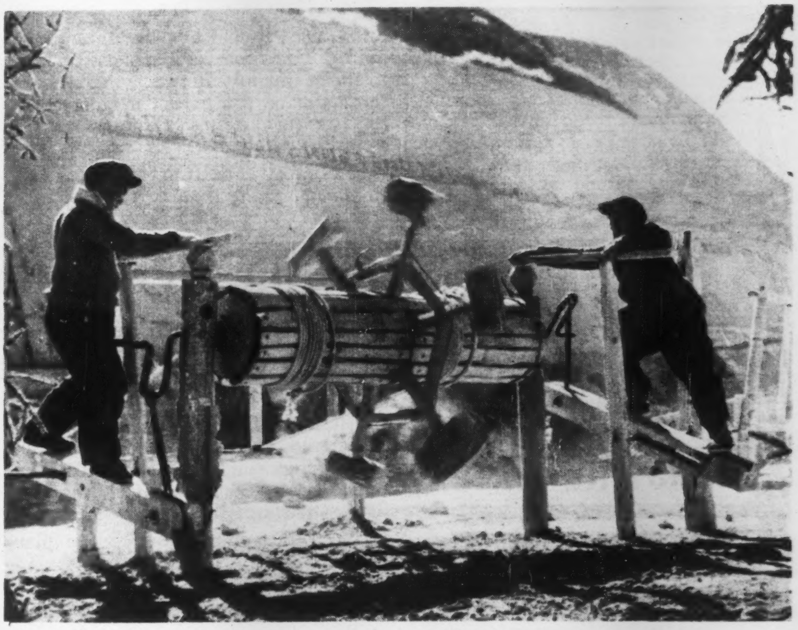
Reds say raft riders are checking

irrigation canal.

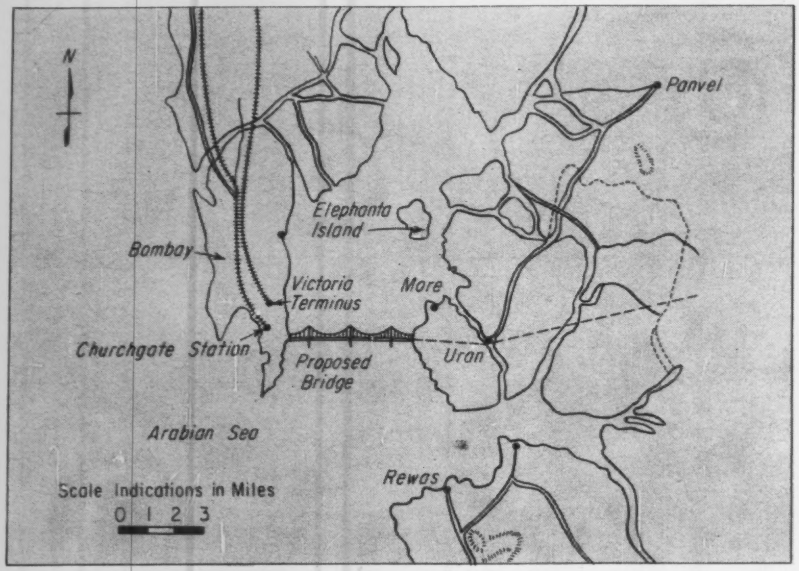
Hammers, bars, and brawn gnaw away a mountainside.

Manpower

river flow.



Treadle-operated winch is used to pull wire.



Bombay Harbor Bridge Proposed

Imagine Manhattan Island without its bridges over the Hudson and East rivers and without its subway and vehicular tunnels under the rivers. Imagine Manhattan connected with the mainland only by two railroads and a couple of highways at its northern tip, but still a place to live for 2 million people and a place of employment for some hundreds of thousands of commuters.

When you have this picture in mind, you have an idea of the traffic situation in Bombay, India. The city is on a long, narrow finger of land running parallel to the mainland. Between the city and the mainland is a harbor that has made the city the leading commercial center of western India.

A Bombay consulting engineer, J. G. Bodhe, of K. I. Irani & Co., has proposed a 4½-mile suspension bridge over the harbor between the southern tip of Bombay and the mainland. He argues that such a bridge would not only alleviate a troublesome traffic situation in Bombay, but open up land on the other side of the harbor for residential and industrial development.

The bridge would have two suspension spans, each one-mile long and anchor spans of half-mile length, with suspension towers 770 ft high. The bridge would have a width of 75 ft and a clearance of 165 ft above mean high water.

Because business and commerce is concentrated at the southern end of Bombay, real estate is at a premium there. Mr. Bodhe suggests a 1,500-ft-dia spiral approach with a 1:30 gradient for the Bombay end of the bridge.

Agadir Rebuilding Plan Approved

The Moroccan government has approved a master plan for rebuilding Agadir, the Mediterranean coastal city destroyed in an earthquake last winter (ENR Mar. 10, 1960, p. 26).

Harland Bartholomew & Associates, planning consultants of St. Louis, Mo., prepared the master plan. The International Cooperation Administration financed the preparation of the planners' report.

The plan provides for expansion of Agadir to an eventual population of 50,000. Population was 32,000 before last year's earthquake.

The planners retain existing streets, buildings and utilities as far as possible. But they take advantage of the opportunity to shift the city's geographic center away from the region of greatest seismic danger. Certain areas near a great subsurface geological fault will not be rebuilt.

The Moroccan Ministry of Public Works has been building prefabricated housing for the 10,000 refugees, who have been living in tents. Last month 3,000 refugees moved into small "cells" built of asbestos-cement siding and aluminum roofs on earth floors.

7/8" BLASTING MATS

BY SCOTT

Now a Standard Size Wire Rope Mat Available From Stock. Also ½", ⅝", ¾".

▶ TOP QUALITY...
▶ LOW COST

Scott Mats are close woven, made of selected, improved plow steel wire rope, and fitted with heavy-duty rings. They are stronger, longer lasting, more economical.

Used by leading contractors throughout the country.

Special sizes and Manila & Sisal Mats Made To Order

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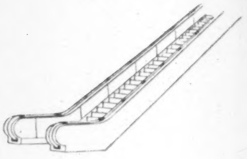
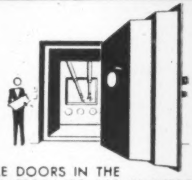
Offers the advantages accruing from concentration on one source for a great variety of building products



PEELLE MOTORSTAIRS

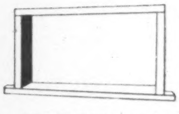
Over ⅔ of the present thousand Peelle Motorstairs are re-orders. For instance, expansion plans for the New York Port Authority Bus Terminal call for 41 Peelle Motorstairs because the 31 original Motorstairs satisfactorily handled the equivalent of over twice the U. S. population in ten years. Graceful lines and harmonious colors are pleasingly accented by the exclusive Peelle Safety Handrail with contrasting color spacers. *For more information circle 40 on Readers' Service card.*



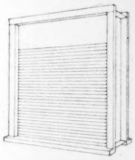
1 OF 9 PEELLE DOORS IN THE INDUSTRIAL REACTOR LABS., INC., PLAINSBORO, N.J.

PEELLE CUSTOM ENGINEERED DOORS FOR AVIATION HANGARS, NUCLEAR FACILITIES, INDUSTRIAL ENTRANCES, POWER PLANTS, ETC.

Many engineers, general contractors and architects rely on Peelle's extensive experience and engineering know-how in adapting large special purpose doors to buildings and in helping them adapt structures to doors. *For more information circle 41 on Readers' Service card.*



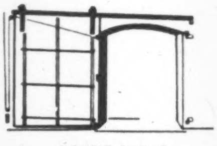
DINING ROOM SIDE



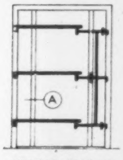
DINING ROOM SIDE

PEELLE PASS WINDOWS

These are widely used to speed service between kitchen and dining areas in schools and restaurants. One is the sliding type—the other is made with extruded aluminum flat-slats that roll up into the head. Both have integral frames and are installed as complete units thus saving money and time. Both have quality design and workmanship—easy to clean—nothing to catch dirt. *For more information circle 42 on Readers' Service card.*



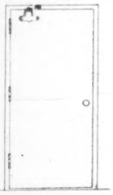
DOUBLE SWING OR SLIDE



SINGLE SWING OR SLIDE

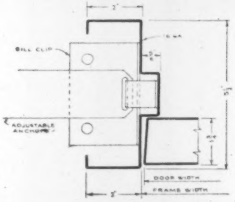
RICHMOND METAL CLAD "FYRGARD" DOORS

Richmond, one of America's oldest and best-known fire door fabricators, furnishes these doors to meet all UL requirements and local building codes. Used in many hospitals, office buildings, factories, garages, warehouses, hotels, multiple dwellings, theatres, schools, etc. Single swing, or slide, double swing or slide. Door operators and fusible links. Many other features. *For more information circle 43 on Readers' Service card.*



ELEVATION

SWINGS



JAMB SECTION

RICHMOND CLASS "A" HOLLOW METAL PACKAGE DOOR IN STOCK SIZES FOR IMMEDIATE DELIVERY

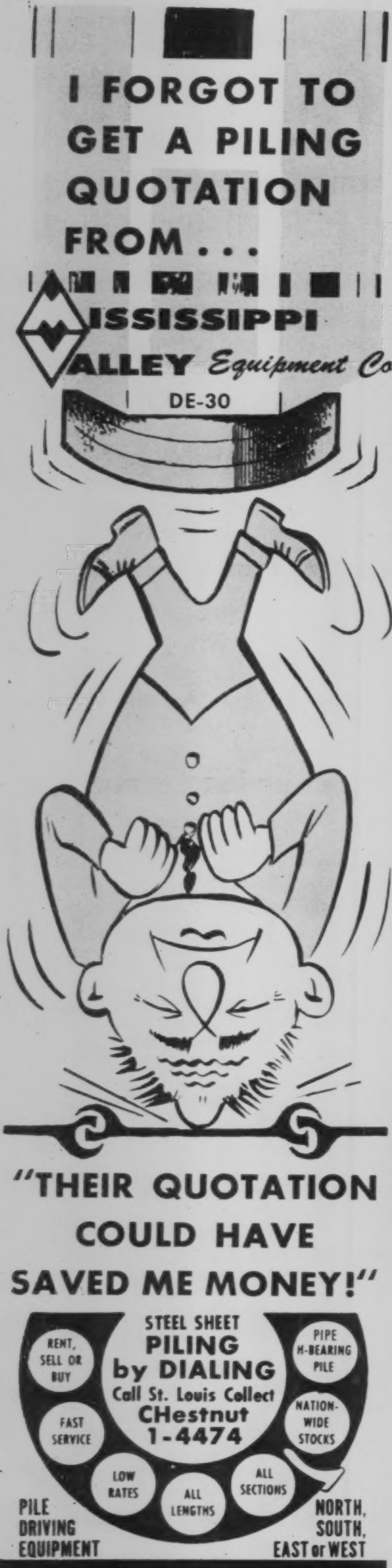
This high quality, class "A" Underwriters' labeled, 16 gauge hollow metal door is complete with a single point latch, a 16 gauge metal labeled frame, 1½ pr. ball bearing hinges, lock or latch and bronze enamel door closer. Right or left hand swing. Sizes 3'0" x 6'8" or 3' x 7'. Can be furnished with fuse link closer. *For more information circle 44 on Readers' Service card.*

SEE OUR CATALOG IN SWEET'S

PEELLE-RICHMOND PRODUCTS
Engineered for the Building Industry

THE PEELLE COMPANY
47 Stewart Ave., Brooklyn 37, N. Y.
THE RICHMOND FIREPROOF DOOR COMPANY
Richmond, Indiana

Circle numbers above on Readers' Service Card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MISSISSIPPI VALLEY Equipment Co.

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STEEL SHEET PILING by DIALING
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RENT, SELL OR BUY
FAST SERVICE
LOW RATES
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PILE DRIVING EQUIPMENT
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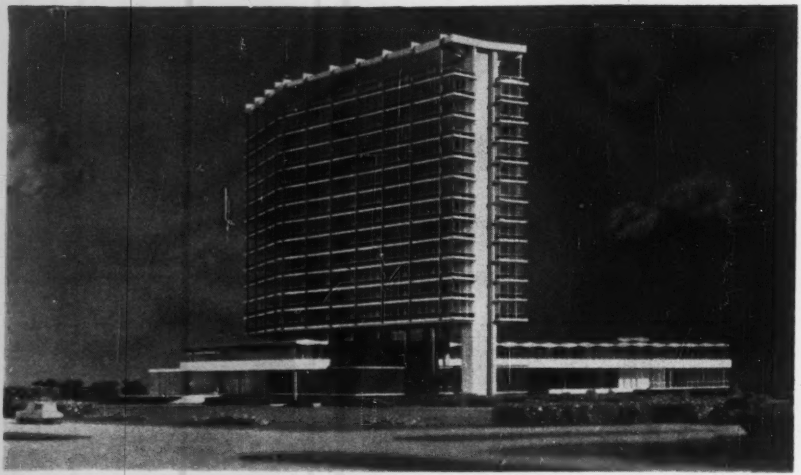
St. Louis 1, Mo. CHestnut 1-4474



Office Framing Hangs From Roof

An unusual blend of reinforced concrete and structural steel framing marks a $5½-million office building under construction in Eindhoven, The Netherlands. From the roof of the reinforced concrete core, tapered steel roof girders will cantilever about 20 ft., supporting 13 office levels below.

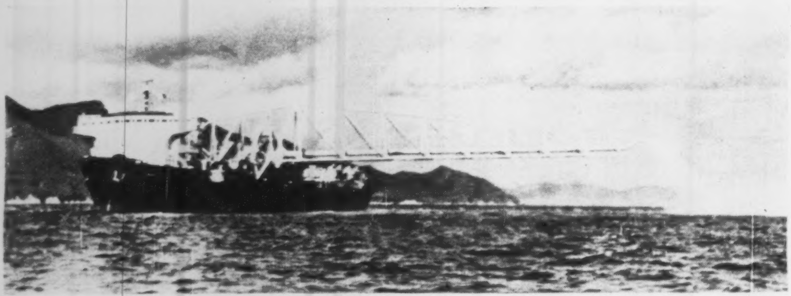
The exterior hangers will function architecturally as columns. Floor slabs in this suspended steel portion will be precast concrete.

The hexagonally shaped core will house elevators, stairwells, utility shafts and corridors. The exterior part of the structure will enclose office space.

Wall facing for the central core end walls will be natural stone. Office space will be sheathed in aluminum sash and spandrel panels.

Other project features include a fully automatic heating and air-conditioning system and parking space for 400 cars and 1,100 bicycles.

Architects are Bureau Roosenburg, Verhave, Luyt and De Iongh of the Hague. The firm of Philip Netherlands is the owner.



Spoil from the bottom of Maracaibo Harbor spews from . . .

The 'Long Arm' of the Zulia

A Japanese-built dredge now deepening the channels in Venezuela's Maracaibo Harbor has a cantilever discharge boom over half as long as the vessel.

The dredge Zulia measures only 548 ft long herself and the cantilever boom reaches out some 328 ft beyond her port side.

The boom can be rotated 180 deg. It supports a 57-in.-dia discharge line from the dredge's four suction drag heads.

The vessel was built in Kure, Japan, by National Bulk Carriers, Inc. It can raise as much as 6,000 cu yd of sand an hour while spewing it well beyond the channel's limits.

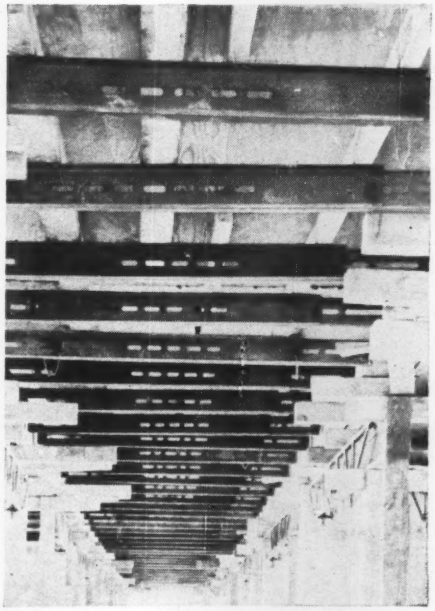
The channel deepening is aimed at accommodating today's larger petroleum tankers and involves depths of 47 to 49 ft.

MODERN SHORING IDEAS

BY **REX® SPANALL**

Big "streets" below let tradesmen do other work while pouring goes on above—an important benefit of wide-spanning Spanall. Note easy job the two men have in setting Spanall 1015 while working on rolling platform. Spanall telescopes to exact size. It's lightweight, simple to handle; yet, it has tremendous load carrying capacity.

How to widen bridges—or build them! Here Spanall 730 is used for shoring and scaffolding (background) operations in widening the George Washington Bridge, New York. See how simplified the shoring is by the Rex-Spanall method.



Saving time on school job—Spanall 46 shores out college dormitory building. This Spanall member handles spans from 4′2″ to 6′11″ to speed up narrow corridor and drophead work.

Business as usual while a big remodeling job goes on above—it's possible with Spanall. Used on this bank project is popular, all-purpose Spanall 730, which adjusts easily for heavy-load formwork from 6′11″ to 29′7″.

LET YOUR SPANALL DISTRIBUTOR ENGINEER YOUR JOB FOR YOU

- Spanall features instant telescopic action —erects faster.
- Lightweight, easy to handle.
- Reduces man-hours substantially.
- Opens up job below for workmen and storage.
- Automatic camber compensation.
- Rent or buy—immediate delivery.

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All-new catalog shows how Spanall cuts construction costs while simplifying and speeding your shoring! Mail coupon.

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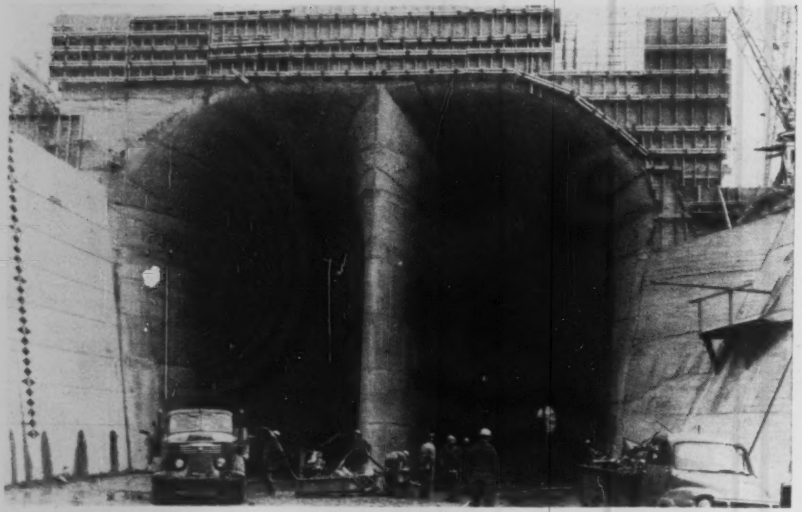


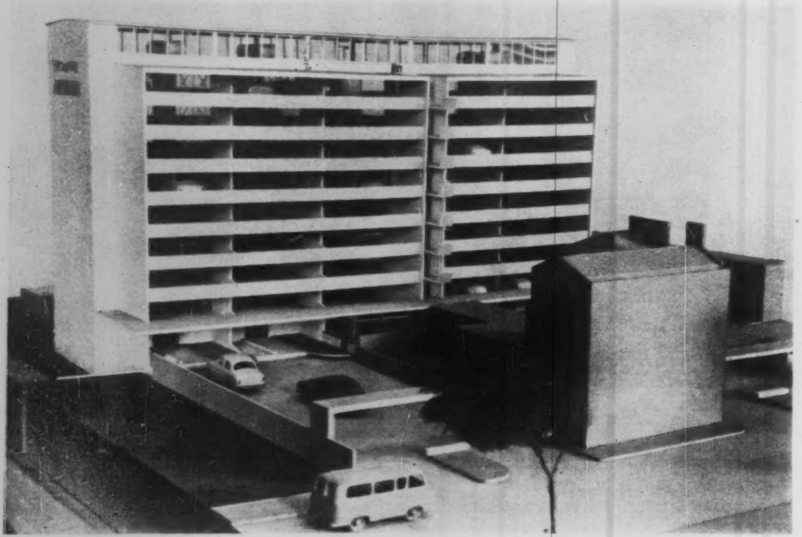
Twin Culverts to Divert River

Twin culverts are now being made ready in order to divert the flow of the Waitaki River at the site of what will be New Zealand's biggest hydroelectric plant.

Running parallel to the course of the river, the culverts are 2,000 ft long and 45 ft tall, can handle six times the normal river flow. They are built in excavated rock.

The entire hydroelectric scheme—Benmore—will include an earthfill dam, concrete spillway block and 540,000-kw power station.

Estimated cost is between $93 million and $96 million.



New Parking for Old England

British designers are joining the trend toward mechanical-stack garages. England's first automatic parking structure in Bristol will hold 318 vehicles.

The garage will operate on a German design, which is called the Antosilo automatic parking system. Designers of the garage are Alec French & Partners. Mechanical sections are being manufactured by Strachan & Henshaw, Ltd, for the owners, Victoria Motor Co. Ltd. All are Bristol firms.

SUBSURFACE EXPLORATION

Dirtmovers: Profit by complete, accurate pre-bid information on presence or absence of bedrock in cut areas and depth to bedrock; establish quantities and types of materials to be excavated; locate suitable borrow pits and location of water table; determine rippability of materials; aid scheduling of equipment during excavation work.

HOW YOU

Paving Contractors: Profit by establishing gravel deposits, volume and type, nearest to the work site.

Consulting Engineers: Profit by predesign subsurface information for buildings, bridges and highways.

Highway Engineers: Establish presence or absence of rock for highway design work; pre-bid classification of materials, volume of materials, subsurface structures.

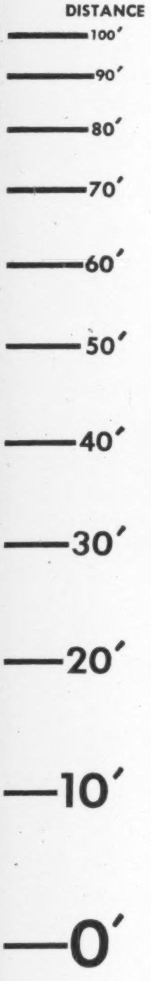
Architects: Establish stability of subsurface materials and depths for all planning.

Quarry Producers: Profit by accurate information of location and size of aggregate deposits, amount of overburden.

Mining Engineers: For example; locate pre-glacial stream channels for placer exploration, determine bedrock depths.

Bridge Builders: Economically establish stability of subsurface structure for foundations.

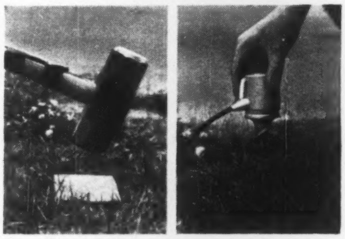
PROFIT WITH THE MD-1...


DISTANCE
100′
90′
80′
70′
60′
50′
40′
30′
20′
10′
0′

Today's profit squeeze and intense competition in the engineering and construction industry can make the MD-1 Engineering Seismograph the most important cost-saving tool you own.

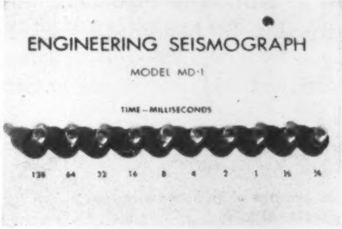
Why? Because daily throughout the world, MD-1 analyses of subsurface material conditions are being quickly converted into profits in the many ways listed above. Yet this vital tool requires no specialized training to operate. It develops accurate, reliable information in the simple manner shown here:

HAMMER PLUS GEOPHONE



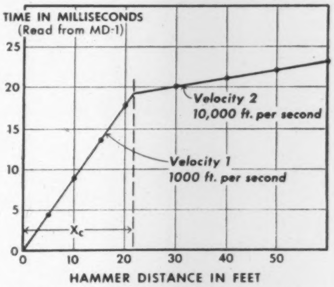
A sledge hammer is struck against a metal plate at known distances from the MD-1. As blow is struck, a switch closes on the hammer, starting the MD-1's electronic counter. The sound waves initiated by the blow are picked up by a geophone, also connected to the MD-1. The time of travel of the *first* or fastest sound wave to reach the geophone is read directly from the MD-1's electronic counter lights.

ELECTRONIC COUNTER


ENGINEERING SEISMOGRAPH
MODEL MD-1
TIME—MILLISECONDS
128
64
32
16
8
4
2
1
½
¼

This travel time is determined by the depth and type of the material; the denser the material, the faster the sound waves travel.

PLOTTING MD-1 READINGS



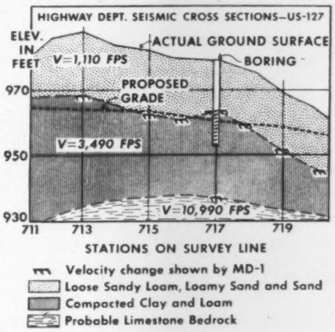
Recorded travel times are plotted on a graph. This time-distance curve represents the velocities of the materials encountered. These velocities indicate the types of materials and each break in the curve indicates a change in material.

DEPTH EQUATION

$$D = \frac{X_c}{2}\sqrt{\frac{V_2 - V_1}{V_2 + V_1}}$$

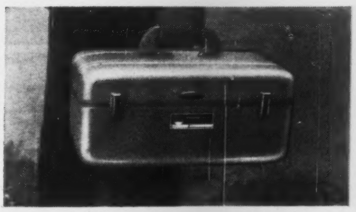
Using the above formula, the depth to denser materials or bedrock is provided. D is the depth, X_c is the hammer distance at which the velocity change occurs, V_1 is the velocity of the top material, and V_2 is the velocity of the second material. Depths to deeper layers are determined the same way.

SUBSURFACE PROFILE


HIGHWAY DEPT. SEISMIC CROSS SECTIONS—US-127
ELEV. IN FEET
970
950
930
711
713
715
717
719
STATIONS ON SURVEY LINE
ACTUAL GROUND SURFACE
BORING
PROPOSED GRADE
V=1,110 FPS
V=3,490 FPS
V=10,990 FPS
Velocity change shown by MD-1
Loose Sandy Loam, Loamy Sand and Sand
Compacted Clay and Loam
Probable Limestone Bedrock

The depths and materials are then marked on a profile map of the job so that subsurface conditions will be considered in the planning and bidding of the work.

PORTABILITY



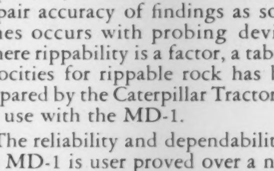
Because of its small size and light weight, the MD-1 can easily be used in areas inaccessible to drilling rigs. Also important, boulder strewn soils do not impair accuracy of findings as sometimes occurs with probing devices. Where rippability is a factor, a table of velocities for rippable rock has been prepared by the Caterpillar Tractor Co. for use with the MD-1.

The reliability and dependability of the MD-1 is user proved over a number of years on thousands of jobs by operators all over the world.

See how you can profit on your next job with this simple to operate tool of the new age in earthmoving. Ask for a demonstration—operate it yourself after a few minutes instruction.

Some MD-1 Owners

Contracting & Materials Co.
Nello L. Teer Co.
Hunting Survey Corp., Ltd.
Peter Kiewit Sons' Co.
Dickerson, Inc.
Euclid, Division of GMC
Caterpillar Tractor Co.
Michigan State Highway Dept.
Ontario Dept. of Highways
Alcoa (Aluminum Co. of America)
U. S. Bureau of Public Roads
U. S. Corps of Engineers
DuPont

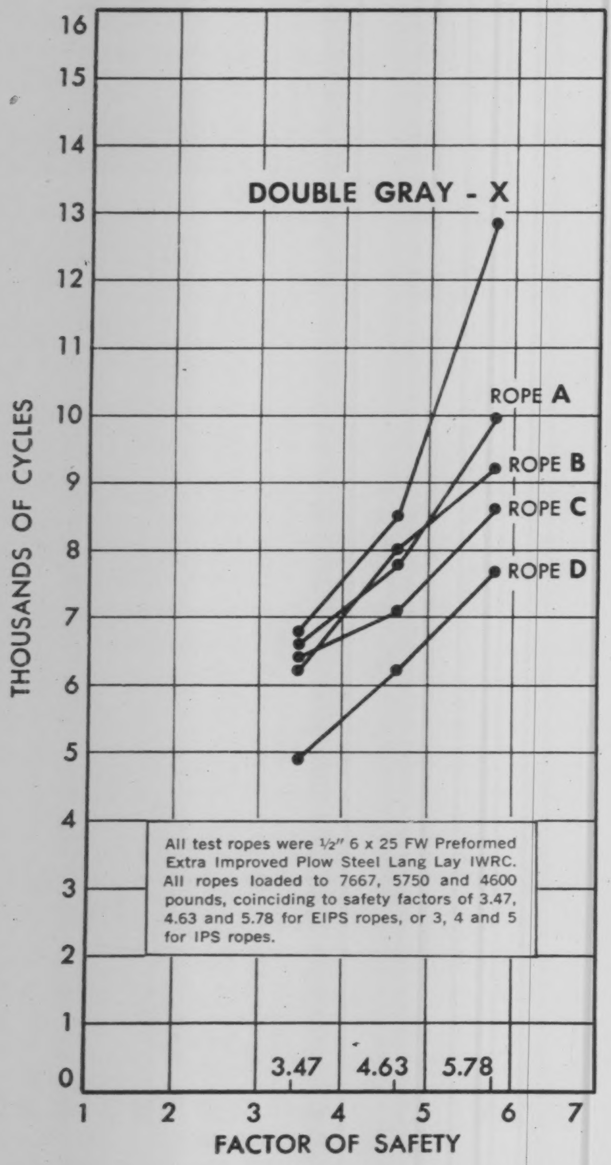


Geophysical
SPECIALTIES COMPANY
15409 Robinwood Drive • Hopkins, Minn.

CIRCLE 125 ON READER SERVICE CARD

DOUBLE GRAY-X®

Laboratory tests prove that CF&I-Wickwire's premium wire rope has 45%* more bending life than the average of other ropes tested



All test ropes were ½″ 6 x 25 FW Preformed Extra Improved Plow Steel Lang Lay IWRC. All ropes loaded to 7667, 5750 and 4600 pounds, coinciding to safety factors of 3.47, 4.63 and 5.78 for EIPS ropes, or 3, 4 and 5 for IPS ropes.

The CF&I-Wickwire engineers who developed Double Gray-X *believed* in their product. So confident were they of its superiority that they decided to field-test prototypes of Double Gray-X as soon as they were perfected. In the months that followed, the top American firms chosen to participate in these tests delivered this verdict: when the going really gets tough, Double Gray-X lasts longer than other wire ropes.

Now, CF&I presents additional proof that Double Gray-X has *superior resistance to bending fatigue,* the chief enemy of wire rope life. In an extended series of tests conducted over the past year at CF&I's Palmer Plant, Double Gray-X proved itself superior to four other wire ropes, all made by major manufacturers.

HOW WERE THE TESTS CONDUCTED?

The five wire ropes tested—all identical in size and specification — all exceeded the catalog breaking strength of extra-improved plow steel ropes. Each rope was subjected to the same series of tests on a 25,000-pound, multiple-reeved fatigue machine, the largest of its kind. This machine punishes wire rope to destruction by bending it back and forth over sheaves.

***Percentage above average of all other wire ropes tested at safety factor of 5.78**

lasts longer

WHAT WERE THE RESULTS OF THE TESTS?

As the chart indicates, Double Gray-X lasted longer than any of the four competing wire ropes at all the safety factors used in the test. At the highest and most commonly-used safety factor, Double Gray-X lasted 30% longer than the rope that lasted next longest, and 68% longer than the rope that lasted the shortest time. Double Gray-X lasted 45% longer than the average of all other wire ropes tested at this safety factor.

WHY DOES DOUBLE GRAY-X LAST LONGER?

It lasts longer because it's the result of a breakthrough in wire-drawing technique. This new process, which includes the use of molybdenum disulphide, creates these outstanding fatigue-resistance factors in Double Gray-X:

- **A Molecular Shield** – Molybdenum disulphide creates a shield around every wire, which serves as a lubricant and prevents the wires from grinding together as the rope operates. Less internal friction results in longer rope life.
- **Smoother Wire Surface** – CF&I's new wire-drawing technique helps eliminate minute surface imperfections in the wire. This smoother surface provides better resistance to fatigue.
- **Extra Toughness** – Molybdenum disulphide lubricates the wires during the drawing process. Since less power is required and less heat generated during this operation, the original toughness of the wires is better preserved.

WHAT CAN DOUBLE GRAY-X DO FOR YOU?

It can save you money. Because Double Gray-X lasts longer on even the toughest jobs, it cuts wire rope repair and replacement costs and rope-installation time. The net result to you is an overall reduction of costly equipment downtime, and a lowering of your total wire rope investment.

As a matter of fact, those of our customers who have already bought and field-tested Double Gray-X have reported considerably longer life and less downtime on their equipment. Join these satisfied customers—try Double Gray-X on *your* equipment right away. Ask your CF&I salesman to give you complete details on these tests.

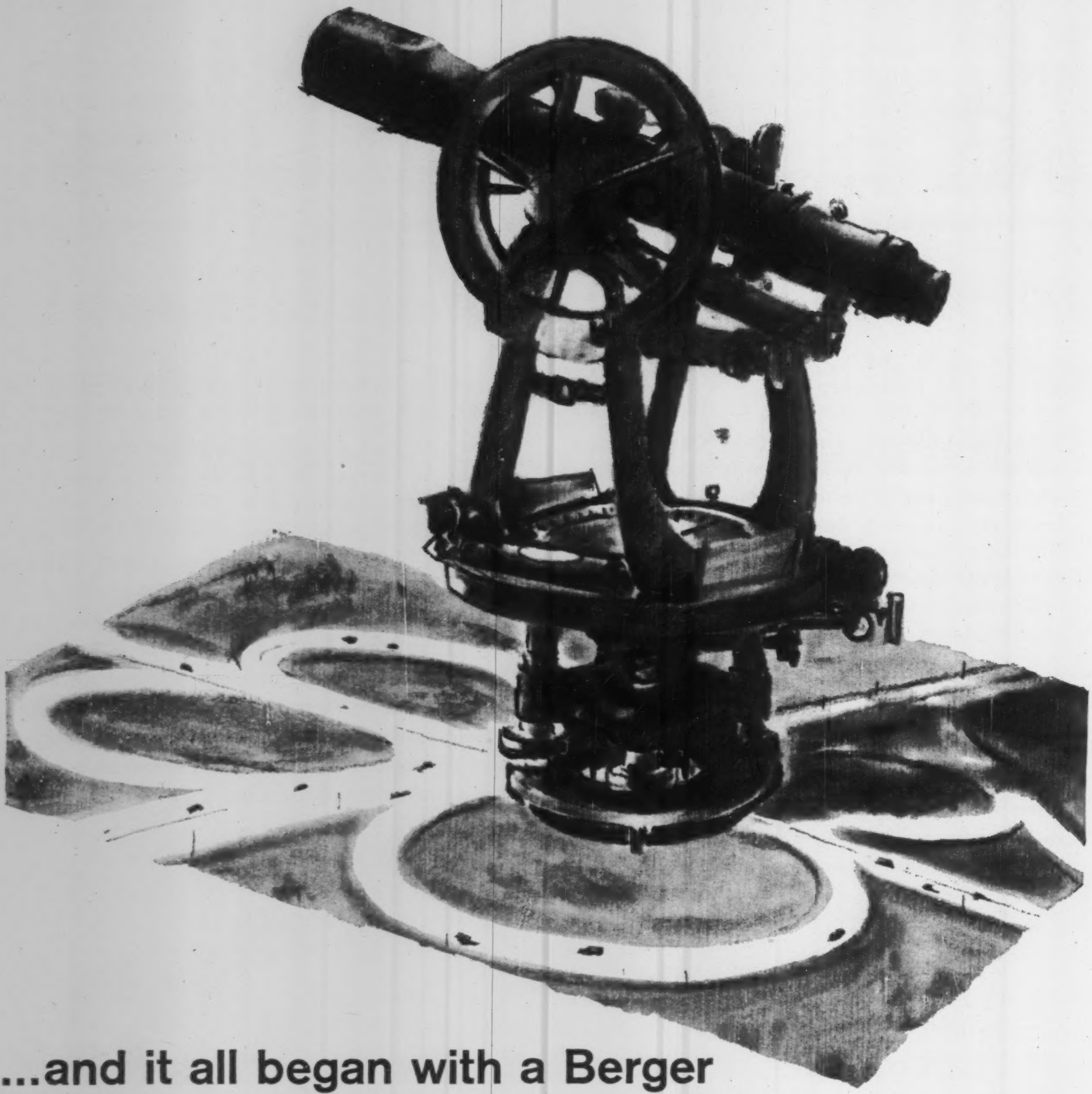
WICKWIRE ROPE
DOUBLE GRAY-X
DOUBLE GRAY-X
A
CF&I PRODUCT

CF&I
STEEL
MADE IN U.S.A.

The Colorado Fuel and Iron Corporation
DENVER • OAKLAND • NEW YORK
SALES OFFICES IN ALL KEY CITIES

6180

CIRCLE 127 ON READER SERVICE CARD



...and it all began with a Berger

Where there's a turnpike to be built—a cloverleaf to be engineered—a skyscraper to lay out—a river to bridge... chances are a Berger will be there getting it under way.

For Berger Instruments are wise in the ways of the country's leading engineers and constructors. They've been field-conditioned to meet the challenging demands of many of the major construction projects of the century.

So when you see the "signs" of *big* construction—Turner, Stone & Webster, F. H. McGraw, among others, look around—a Berger is somewhere on the scene.

Then put yourself behind the Berger and see why.

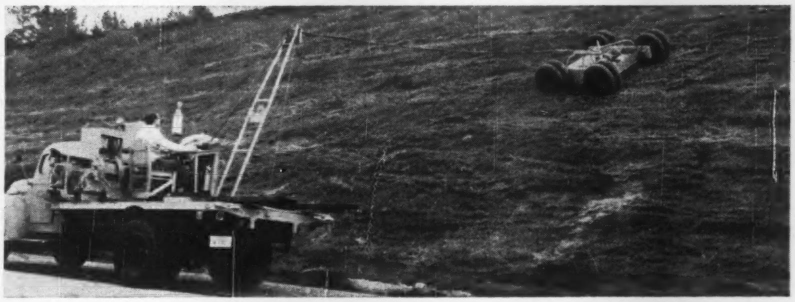
C. L. Berger & Sons, Inc., 45 Williams Street, Boston 19, Mass.

BERGER IN THE MISSILES PROGRAM: Optical alignment tooling, synchro readout devices, precision rotating mechanisms, instrumentation design and manufacturing.

THE BEST IN SIGHT IS BERGER

Engineering & Surveying Instruments...Made in America by American Technicians...Since 1871

Field and Office



Slopes Mowed by Remote Control

Two engineers employed by the South Carolina State Highway Department have applied for a patent on a remote control rotary mower to trim grass brush on highway shoulders and slopes.

The machine, invented by mechanical engineers J. G. Farmer and R. D. Counts, is powered by electricity from a generator mounted on a truck. Power is applied to four sets of dual pneumatic tired wheels. Steering is done by braking or reversing wheels on one side and powering those on the other.

The designers salvaged an obsolete truck with a serviceable engine and mounted a gasoline engine-driven generator on the truck bed. They devised an operator's console with three switches —one for each hand to control steering and a foot pedal.

Control and power circuits to the mower are carried in a 200-ft multiconductor cable fed from a 12-ft boom mounted on the truck bed. Cable is automatically let in or out from a reel controlled by the operator's foot switch.

Why Paving Crews Vary in Size

Production studies of portland cement concrete paving operations conducted by personnel of the Office of Research, Bureau of Public Roads reveal a marked variation in the size of crews on each project and for each paving method used.

BPR engineers studied three projects (of a total of 40) on which slip form pavers were used. Slip form paving crews had an average of 11 fewer men per project than conventional form paving done with one paver (see table).

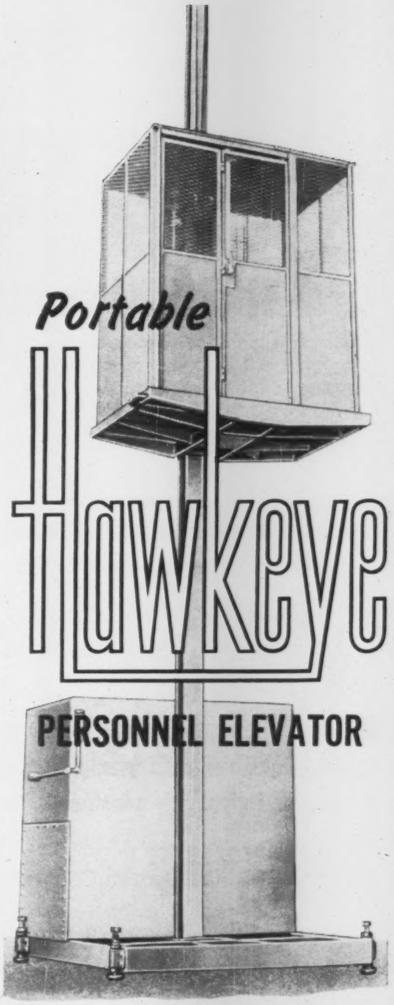
Variations in crew size were not associated directly with rates of production. BPR performance studies of dual drum pavers, which will be released later, indicate that rates on projects where only one paver is used can be consistently maintained at 60 batches or 83 cu yd per working hour when a 10% overload is allowed. (For a 10-in. pavement, 83 cu yd = about 300 sq yd.) Performance studies on the slip form paver indicate its ability to process over 600 sq yd of pavement per hour. It is not known whether the use of a second dual drum paver with the slip form paver would result in additional labor savings.

On one-paver jobs, there is an internal variation in crew make-up depending on whether one-lane or two-lane conventional form paving was done. Data does not include men used for batch hauling, operation of the plant or bulk delivery of materials.

Comparison of Crew Size, Portland Cement Concrete Paving

Operations performed	Number of men used							
	Slip form paving [1] Two-lane one paver		Conventional paving [2] Two-lane one paver		Conventional paving [3] One-lane one paver		Conventional paving [4] Two-lane two pavers	
	Average	Job range	Average	Job range	Average	Job range	Average	Job range
Paving, finishing, joints and curing	27	26–28	27	18–41	22	17–29	31	23–37
Forming and/or subgrading	14	13–15	25	17–40	30	22–41	30	21–42
TOTAL	41	39–42	52	35–81	52	41–70	61	49–69

[1] 3 projects [2] 12 projects [3] 13 projects [4] 12 projects


Portable Hawkeye
PERSONNEL ELEVATOR

Fastest, Safest, Surest
way to the top
for Men and Materials

Now you can have all the time-saving, labor-saving convenience of an elevator PLUS portability and low cost! The Hawkeye moves men and materials safely and surely to the top during construction or in permanent installations for operation and maintenance of production equipment. Your own men can move the portable model Hawkeye to its next point of need quickly and easily. Write today for complete information on the savings and safety that will be yours with Hawkeye!

Hawkeye **PRODUCTS CORP.**
212 Dey Building
Iowa City, Iowa

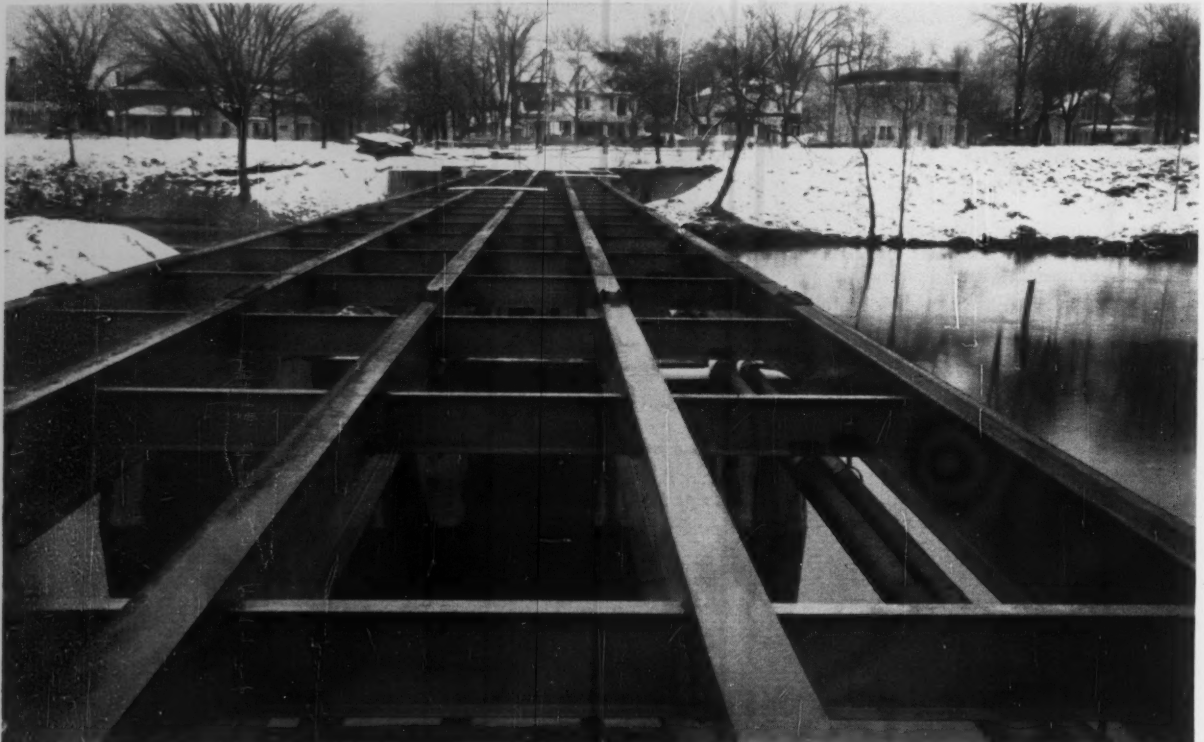
no wonder the contract went to steel—steel cut costs by $23,000!

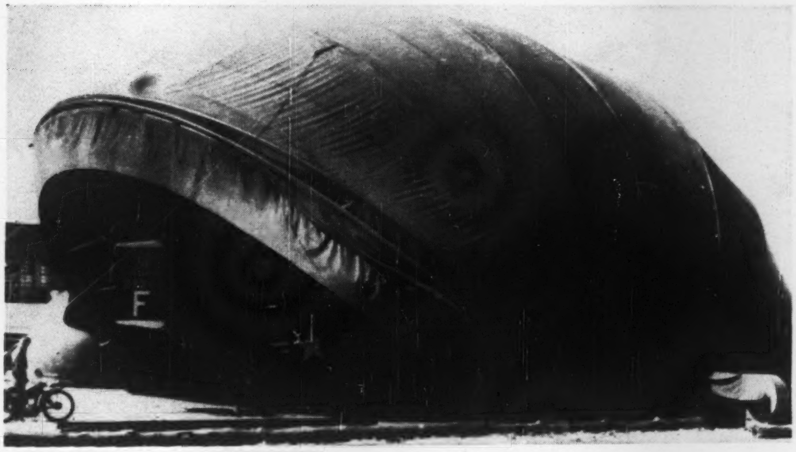
They were almost ready to go ahead on the new bridge in Elkhart County, Indiana, when they decided to take a second look at costs. Original plans called for material other than steel, but maybe steel construction could save money.

And save, it did! Steel bids were actually $23,000 lower and that wasn't all. Maintenance had not been one of the considerations till the steel bid suggested its importance—as one consulting engineer put it, "I've never seen or heard of any type bridge which is maintenance-free." Thus, even with maintenance included, steel construction was shown to be less costly than any other material. In fact, accompanying studies clearly showed the only maintenance required would be painting and that only $4,488.84 invested at 3% would take care of that for 50 years. Thoroughly convinced, the County Commissioners changed the plans and awarded the contract to steel.

Use Steel for Modern Construction

This is another example of the efficiency, lower initial cost and minimal maintenance required when construction plans call for STEEL!

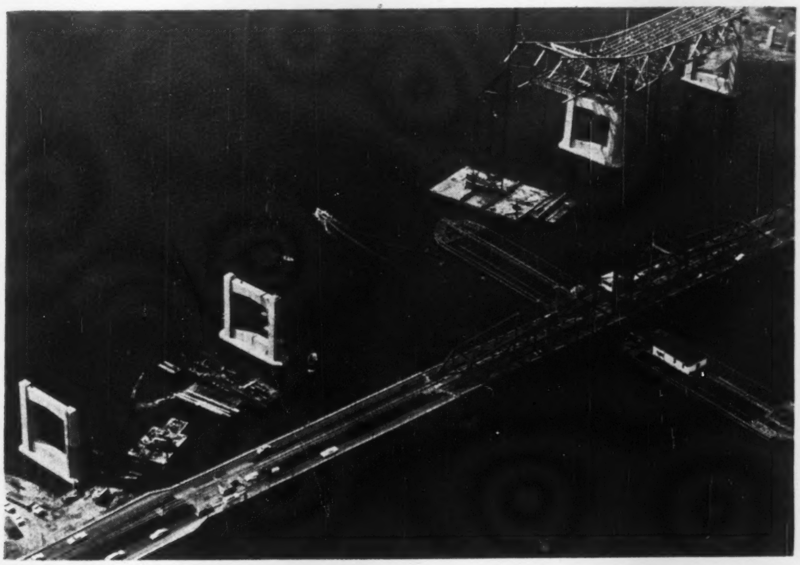




A Whale of an Aircraft Hangar

Resembling a giant beached whale, this structure is the Army Quartermaster Corps' new frame and air-supported aircraft hangar.

The structure's fabric skin stretches over a lightweight metal frame and rests on auxiliary steel arch supports. It is inflated with a small blower and is fully air-supported after its entrance is closed. The 80-ft-long hangar is 72 ft wide and 36 ft high at its center. It is designed to withstand gusts of wind up to 75 mph. The hangar will be used for aircraft field maintenance.



Derrick on a Barge Spins a Span

With most of the 51 piers complete, the American Bridge Division of U.S. Steel is erecting the high level spans for the $15-million bridge linking Duluth, Minn. and Superior, Wis. Traffic will start moving across the 7,975-ft-long, four-lane bridge late next year (ENR Dec. 24, 1959, p. 36).

American Bridge uses a barge-mounted 120-ft derrick for work on the 600-ft through tied-arch suspended center span. One 270-ft anchor span is already finished.

The bridge will provide a minimum clearance of 120 ft over the navigation channel of St. Louis Bay. Howard, Needles, Tammen & Bergendoff are consulting engineers on the project.

STEEL CONSTRUCTION IS SIMPLER IN DESIGN

because steel leads naturally to designs which express the function of the structure, no matter how simple or complex.

LESS EXPENSIVE

because it can be used to support loads economically on spans of any desired length, and because the lightness of steel in proportion to its strength makes it the least costly to transport and to handle on the job site.

STRONGER AND LIGHTER

because dead load stresses are minimized. Steel decking may take the form of flat steel plates, corrugated steel planks or gridwork either open or filled.

MODERN

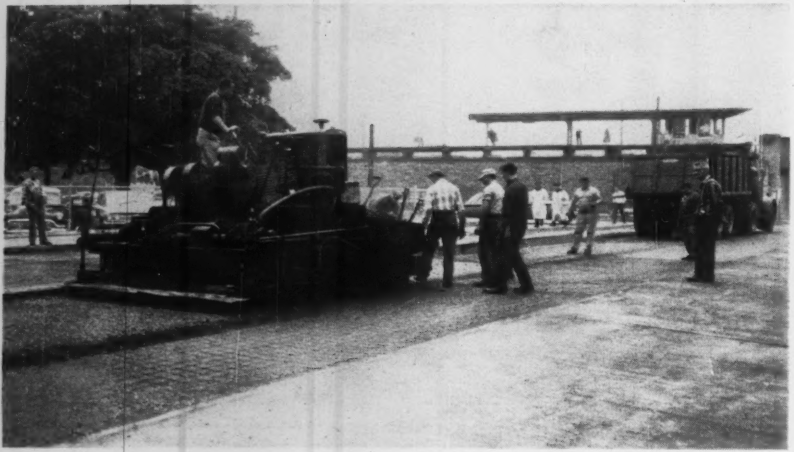
because steel can be fabricated into forms of the utmost lightness and grace as well as into massive and majestic structures. What's more, steel can be coated with color in infinite variety to blend or contrast with the surrounding landscape—thus form and color are combined by the designer to attain modern beauty and perfection.

INLAND®

INLAND STEEL COMPANY

30 West Monroe Street • Chicago 3, Illinois

Wide Flange Beams • Steel Plates • Bearing Piles and Steel Sheet Piling • Ti-Co® Galvanized Sheets • 4-Way® Safety Plate • Enameling Iron • Sub-Purlins



Multiple-Lift Fabric in Asphalt

Installation of the first multiple-layer asphaltic concrete pavement reinforced with wire fabric has been completed in Massapequa, N. Y.

The contractor placed the pavement in successive 4-in. lifts. Each lift is reinforced with 6x6-10/10 wire. Maximum total thickness of the pavement is 14 in.

Engineers designed the pavement to raise the grade of an existing downtown street. The original 40-ft-wide street comprised two 9-ft traffic lanes of concrete with an 11-ft-wide compacted shoulder on each side.

A change in grade was necessary to conform to first floor elevations of adjacent buildings and to provide more positive control of storm water runoff in the area.

Engineers ruled out removal and replacement of the old pavement because of the length of time required and accompanying disruption of normal business activity.

Thomas R. Pynchon, superintendent of the Town of Oyster Bay, in which Massapequa is located, and consulting engineers Sidney B. Bowne & Son of Mineola, decided to have the work done in stages.

The first step was the placing of a 6-in.-thick base course of concrete in strips approximately 20 ft wide on both sides of the old 18-ft wide concrete pavement.

Top elevation of the concrete base course is 2½ in. lower than the finished grade of the new pavement. The contractor cast new concrete curbs monolithically with the exterior strips.

The engineers chose a multiple-layer asphalt pavement to build the center section of the old pavement up to the same level.

Although the asphaltic concrete mixture was designed to be stable under traffic, concern over the possible lower stability of deep layers and the increased stresses in areas that were adjacent to the rigid portland cement concrete sections caused the designers to specify reinforcing.

With preparatory work done, the contractor raised the grade of the 18- by 350-ft center strip in one day.

Workmen first cleaned the old pavement thoroughly. Next came a tack coat to help bond the asphaltic concrete to the concrete.

Sheets of wire fabric—25 ft long and 9 ft 6 in. wide—were placed longitudinally on the treated concrete. Two sheets overlapped about 6 in. at the center of the pavement. Sheets also overlapped about the same distance at the ends.

The contractor then placed and compacted a 4-in. layer of asphaltic concrete on top of the wire fabric. Sheets of fabric were spread on the compacted layer, another lift was placed, and the process was repeated until the specified grade was reached.

Final steps were the placing of a 1½-in.-thick binder course and a 1-in. wearing course across the entire 60-ft width of street from curb to curb, over both concrete exterior strips and the reinforced asphaltic concrete center section.

Fabric sheets were laid flat on the existing pavement or previously placed lift. Later checks revealed that the wire worked up into the asphaltic concrete and assumed a curved shape from top to bottom of the lift. Engineers believe this distribution increases the stabilizing effect of the fabric.

Lizza and Sons, Inc., of Oyster Bay, performed the work under a $313,000 contract. Superintendent was Jim Whitaker.

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PLANNING and
OPERATIONAL

URBAN MASTER PLANNING

SUB-SOIL
INVESTIGATIONS and FOUNDATION
DESIGN

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and supervision
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HIGHWAYS, BRIDGES and STREETS

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DAMS, WATERWAYS
and EARTHWORKS

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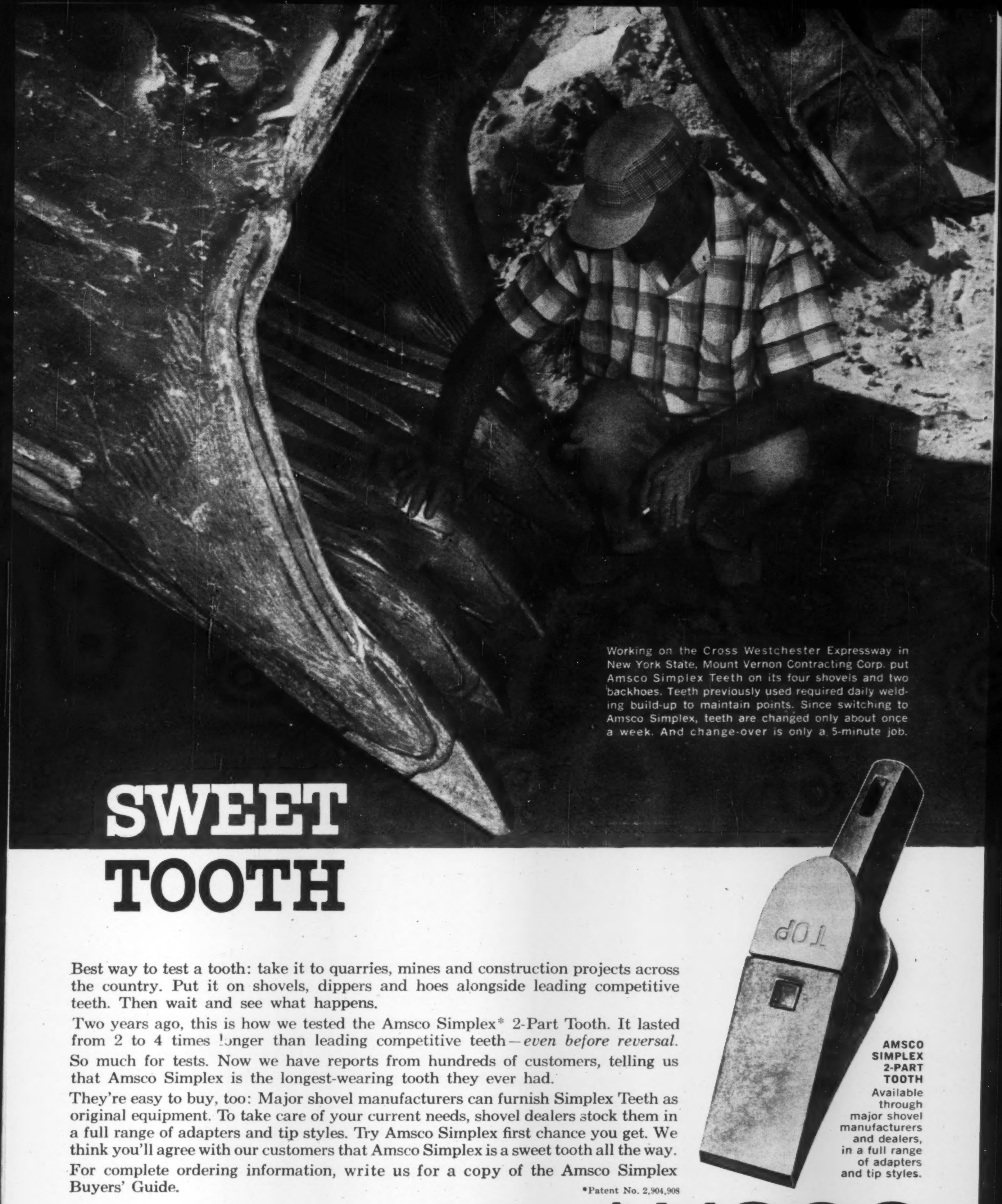
Massachusetts

We invite you to
contact us for a
comprehensive
brochure, listing
completed projects
and case histories,
and including our
statement of
experience and areas
of specialization.



Working on the Cross Westchester Expressway in New York State, Mount Vernon Contracting Corp. put Amsco Simplex Teeth on its four shovels and two backhoes. Teeth previously used required daily welding build-up to maintain points. Since switching to Amsco Simplex, teeth are changed only about once a week. And change-over is only a 5-minute job.

SWEET TOOTH

Best way to test a tooth: take it to quarries, mines and construction projects across the country. Put it on shovels, dippers and hoes alongside leading competitive teeth. Then wait and see what happens.

Two years ago, this is how we tested the Amsco Simplex* 2-Part Tooth. It lasted from 2 to 4 times longer than leading competitive teeth—*even before reversal.*

So much for tests. Now we have reports from hundreds of customers, telling us that Amsco Simplex is the longest-wearing tooth they ever had.

They're easy to buy, too: Major shovel manufacturers can furnish Simplex Teeth as original equipment. To take care of your current needs, shovel dealers stock them in a full range of adapters and tip styles. Try Amsco Simplex first chance you get. We think you'll agree with our customers that Amsco Simplex is a sweet tooth all the way.

For complete ordering information, write us for a copy of the Amsco Simplex Buyers' Guide.

*Patent No. 2,904,908

AMSCO SIMPLEX 2-PART TOOTH
Available through major shovel manufacturers and dealers, in a full range of adapters and tip styles.

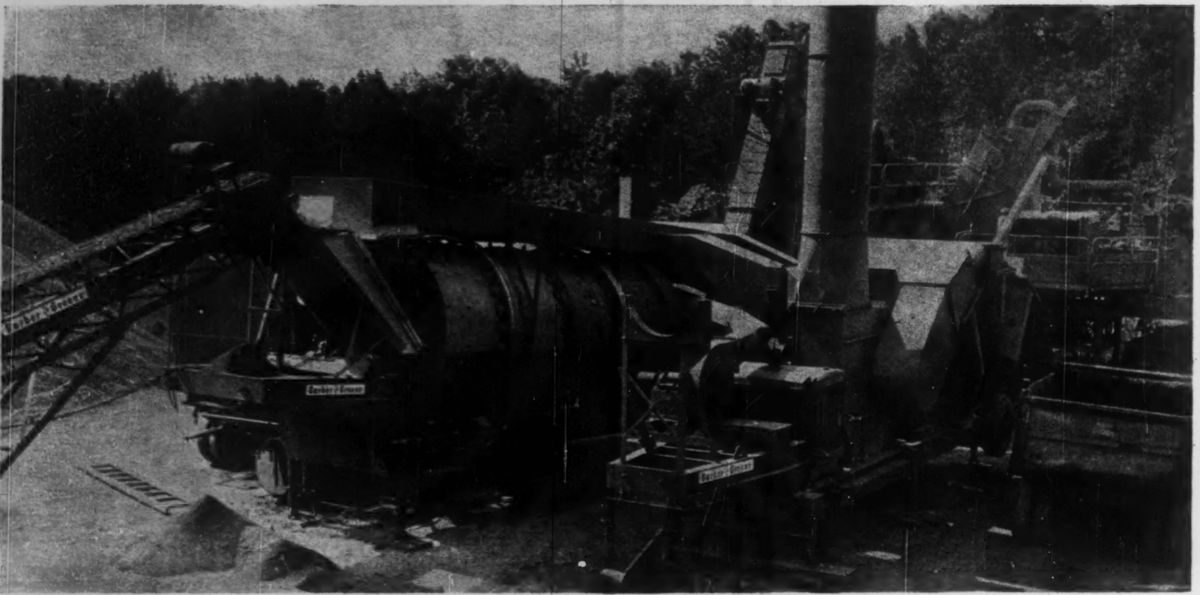
AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

Other Plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California
St. Louis. *In Canada:* Joliette Steel and Manitoba Steel Foundry Divisions

CIRCLE 133 ON READER SERVICE CARD



A key component in an asphalt plant is the dryer, with its associated dust collection system.

Aggregate Drying: A Two-Year Study

The Barber-Greene Co., Aurora, Ill., is redesigning its line of aggregate dryers for asphalt plants to conform with findings of a two-year, $175,000 research program, which it concluded recently.

A dryer, with its associated exhaust gas and dust collection equipment, plays a key role in plant performance. It usually establishes the maximum production that can be obtained under given operating conditions.

Barber-Greene's studies were made on full-scale dryers under completely controlled conditions. For practical reasons, tests were conducted (1) at a 100-300 ton per hour operating range, (2) by re-use of the same aggregate for multiple tests, and (3) by restricting drying to removal of surface moisture only.

Dryers tested were 7 and 9 ft in dia and 20 and 30 ft long. Over 600 individual test runs were carried out and some 30,000 bits of data recorded.

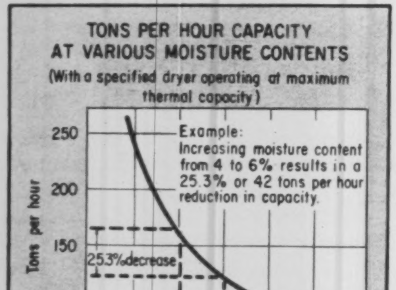
Dryer operation involves a large number of interrelated variables. Three factors were held constant for all tests to give a common base against which all other variables could be measured.

1. Aggregate temperature at point of discharge from the dryer (325°±10°). The sand used was bone dry at discharge.

2. All summary test comparisons were made with the same amount (½%) of carbon monoxide present in the exhaust gas. This allowed comparison of tests at the same level of combustion efficiency.

3. The aggregate was held as constant as feasible. Periodically, aggregate in the system was removed and a fresh supply introduced.

Principal variables in the testing program were tonnage rate; moisture content; rate of flow of air through the dryer; burner fuel oil rate; burner air flow rate; drum slope, length and diameter; and lifting flight design and arrangement.



MOISTURE CONTENT is a big factor in dryer production, which is dependent on many related variables.

Many conclusions were drawn as a result of the tests. Major ones were these:

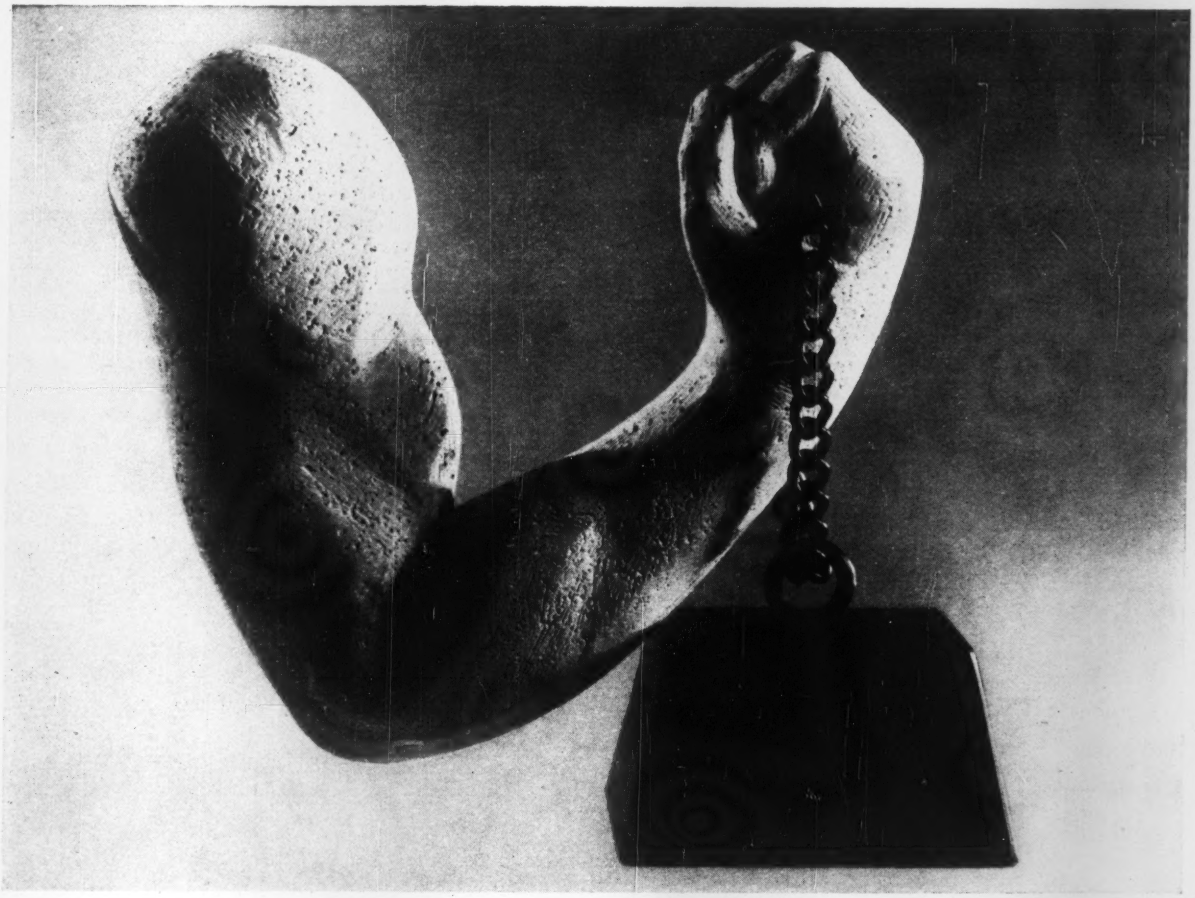
- For any one drum, with other factors held constant, an increase in burner and air flow resulted in an increase in production capacity—with no apparent stopping point.

Temperatures at critical points in the dryer might, however, rise high enough to decrease the life of dryer components and the hazard of burning out chambers and drums under improper operation or because of failure of the exhaust fan or aggregate feed would be increased.

- Dust carry-out increased in proportion to the square of the gas exhaust volume as the volume was increased in the same drum.

To properly compare dryer performance factors, comparisons should be based upon the same drum gas velocities, rather than total volume of exhaust gas.

- On dryers of the same length with the same drum gas velocity and with other factors held constant, maximum production capacity will vary directly with cross-sectional area of the drum.
- In comparing dryers of the same

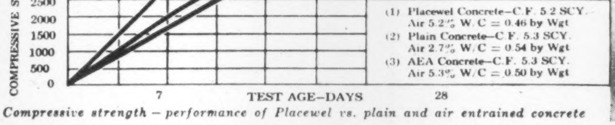


Increase concrete strength 30% with J-M Placewel

. . . the liquid admixture that gives you 5 key controls of concrete

Placewel®, a product of Johns-Manville, world's largest industrial user of portland cement, permits a new high in compressive and flexural strength. This superiority has been proved in millions of yards of concrete.

Placewel is a water-reducing, dispersing agent *plus* a catalyst. It is available with or without an air entraining agent. Placewel, by breaking up the cement flocs, releases water for lubrication that isn't normally available. Thus, mixing water requirements are cut without relying on air entrainment alone. The Placewel catalyst enhances the strength-gaining characteristics of portland cement. This unique combination of properties provides a 30% increase in concrete strength (see chart).



Compressive strength – performance of Placewel vs. plain and air entrained concrete

Less than three ounces of Placewel per sack of cement will also –

- Increase durability 350%
- Increase workability
- Improve dimensional stability
- Reduce permeability

J-M Retardwel® is recommended when concreting conditions require longer placing and finishing time. Retardwel delays the initial set of concrete and yet provides higher 24 hour strength.

Architects and engineers the world over have learned that Placewel and Retardwel give them complete control over the concrete they specify. For full information and technical assistance write: Johns-Manville, Box 14, New York 16, N. Y.

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CIRCLE 135 ON READER SERVICE CARD

CIRCLE 136 ON READER SERVICE CARD→

EXPLOSIVES

ENERGY...

vs. Mechanical Energy

Cheaper blasting materials and improved drilling equipment have reduced the cost of explosives energy to the point where it is doing work formerly reserved for mechanical equipment. By putting more of this low-cost explosives energy to work, machinery operates more efficiently, costs are lowered all along the line.

Smart, profit-minded operators are taking a closer look at the cost of mechanical energy vs. explosives energy and they are coming up with important savings in machinery, manpower, and time—for example:

In coal stripping, explosives force is used to move up to 50% of the overburden directly on to the spoil pile. Mechanical handling costs are reduced, and coal is uncovered more rapidly.

In open pit ore mining, explosives factors are being designed to gain additional fragmentation. Much of the material by-passes the primary crusher. Production is speeded, overall costs lowered.

In quarrying and construction, operators are finding it no longer pays to blast rock just hard enough for equipment to handle it. They are taking advantage of lower drilling and blasting costs to gain more fragmentation and displacement. And in the process they are making important savings in wear on crushers, dipper teeth, wire rope, and truck bodies. They are reducing operating costs, eliminating production delays.

The economics of drilling and blasting have changed. Looking for ways to reduce blasting costs alone is not enough. The real savings come when you look at explosives energy as a way to reduce overall operating costs.

For a closer look at some of the ways explosives energy can lower your costs all along the line, look to Atlas' full line—the only full line in the industry. Expanded plant facilities are now in production at Joplin, Missouri to assure ready availability of all products. And to give you faster, more flexible local service, new distribution facilities are being established coast to coast. Call in your Atlas Representative. His experience with the newest advances in explosives, blasting agents, and blasting techniques can help you measure the relative economy of explosives energy vs. mechanical energy in your operation.

ATLAS POWDER COMPANY
Explosives Division • Wilmington, Del.

ATLAS

ATLAS EXPLOSIVES

← *Using explosives energy to cast overburden to spoil pile at a large Midwest coal stripping.*

New Champion Paper Office Supported by Armco Piling

Rig drives Armco Pipe Piles with mandrel.

Steel

for strength, economy, durability

Photo of model of new office building of The Champion Paper and Fibre Company. Structure is nearing completion.

New steels are born at Armco
CHAMPION PAPERS

General Contractor: Frank Messer & Sons, Inc., Cincinnati
Piling Contractor: C. L. Guild Construction Co., Inc.; East Providence, R. I.
Architects: Harry Hake & Harry Hake, Jr., Cincinnati; Winkler, Ranck and Beeghly, Hamilton, Ohio

At Hamilton, Ohio, The Champion Paper and Fibre Company is completing a new General Office building. Armco Pipe Piles provide a foundation for this contemporary structure.

These piles are 12-inch, O.D., .133-inch wall thickness. A driving mandrel was used with a Vulcan #1 hammer to drive the 35-ton piles from 14 to 31 feet.

Armco Pipe Piles can be driven with any standard pile-driving equipment. Alignment can be quickly verified by lighting the pile interior before pouring concrete. These piles are supplied in 10- to 22-inch diameters, with a wide range of wall thicknesses. Manufactured to A.S.T.M. Specifications. Write for catalog containing valuable engineering data. Armco Drainage & Metal Products, Inc., 5411B Curtis Street, Middletown, Ohio.

Inspector, with mirror in bright sun, checks interior of Armco Piles for alignment.

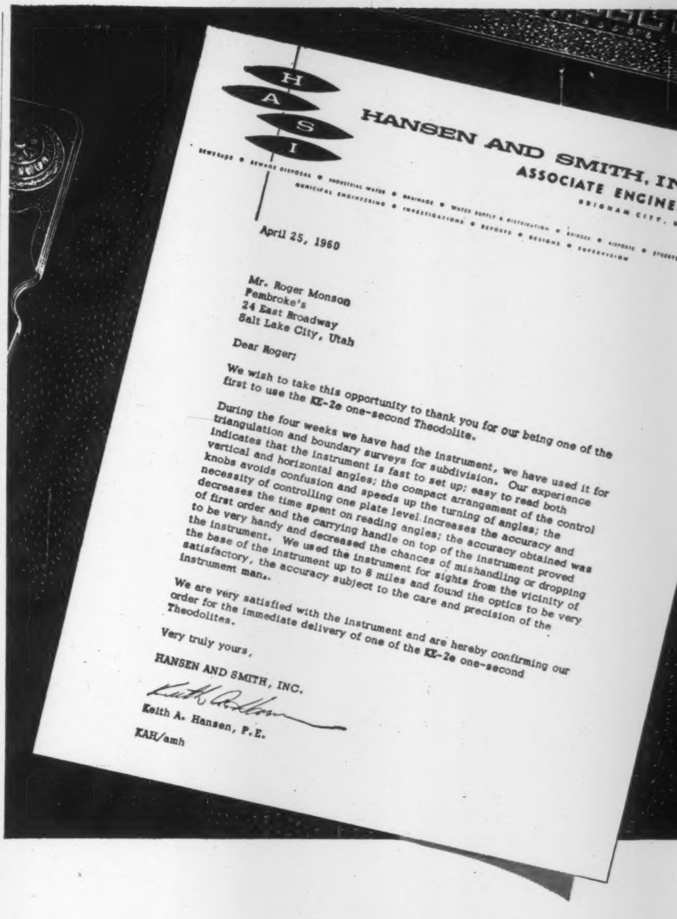
ARMCO Drainage & Metal Products

cross-sectional area with the same drum gas velocity, the maximum productive capacity may be increased by increasing the length, but on less than a direct ratio.

Increasing the length of one dryer from 20 to 30 ft (50%) increased the capacity only 20.5%.

- An increase in drum gas velocity increases the maximum production capacity in proportion to the 0.63 power of the velocity.
- Thermal efficiency (ratio between total heat units released and heat units used in effective work) is a constant if the dryer is properly balanced and operated, regardless of dryer diameter, length, drum gas velocity, etc.
- A much higher proportion of heat transfer to the aggregate takes place through radiation than previously believed.
- Increasing burner efficiency is a relatively minor factor in increasing production.
- Assuming adequate design that will produce a veil of material in suspension across the drum a small percentage of the time the aggregate is being heated, detail differences in flight design are less important to capacity than other factors.
- Flights usually retard rather than speed up the flow of material through the dryer, as compared with a drum with no flights.
- By varying drum slope, rotating speed and/or flight design, any degree of material concentration can be achieved within the drum regardless of length or diameter. This is a key factor in determining particle retention time (and, hence, the amount of moisture removal).
- Dead load (weight of material left in the drum when both the dryer feed and rotation are stopped) should not exceed 16% of the drum volume. Too high a proportion will lead to surging and erratic flow of the cascading material through the drum, giving an uneven drying result at the discharge end.
- Removal of internal moisture (particularly in the coarse particles) is helped by longer retention time. Longer retention time is a function of drum volume. Longer retention time means reduced capacity in the same size drum.
- Moisture content of the aggregate has a great effect on dryer capacity, as shown in the drawing.

Barber-Greene believes the most important factor in dryer selection is the choice of a drum gas velocity to suit specific operating conditions; next step is to choose the size of dryer to provide desired capacity.



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April 25, 1960

Mr. Roger Monson
Pembroke's
24 East Broadway
Salt Lake City, Utah

Dear Roger;

We wish to take this opportunity to thank you for our being one of the first to use the KE-2e one-second Theodolite.

During the four weeks we have had the instrument, we have used it for triangulation and boundary surveys for subdivision. Our experience indicates that the instrument is fast to set up; easy to read both vertical and horizontal angles; the compact arrangement of the control knobs avoids confusion and speeds up the turning of angles; the necessity of controlling one plate level increases the accuracy and decreases the time spent on reading angles; the accuracy obtained was of first order and the carrying handle on top of the instrument proved to be very handy and decreased the chances of mishandling or dropping the instrument. We used the instrument for sights from the vicinity of the base of the instrument up to 8 miles and found the optics to be very satisfactory, the accuracy subject to the care and precision of the instrument man.

We are very satisfied with the instrument and are hereby confirming our order for the immediate delivery of one of the KE-2e one-second Theodolites.

Very truly yours,

HANSEN AND SMITH, INC.

Keith A. Hansen, P.E.

KAH/amh

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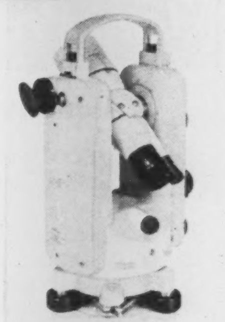
The new KE-2e Theodolite by K+E

Prompted by an extensive survey to determine what *American* surveying practice called for in a theodolite, the brilliant, new KE-2e has excited widespread interest throughout the engineering fraternity for its many important and exclusive design features. Letters of acclaim, like the one above lauding the KE-2e's first-of-its-kind performance, reflect a perfect mating of surveying instrument to field requirements.

A few minutes trial with this 1-second, directional, erected image theodolite will show you what *you've* been missing in theodolite performance. To arrange for a demonstration, get additional information, or both — simply fill out and mail the coupon below:



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Gentlemen:
☐ Please have a K&E representative make an appointment to show me the KE-2e Theodolite.
☐ Please send me additional information on the KE-2e Theodolite.
Name & Title: ____________
Company & Address: ____________
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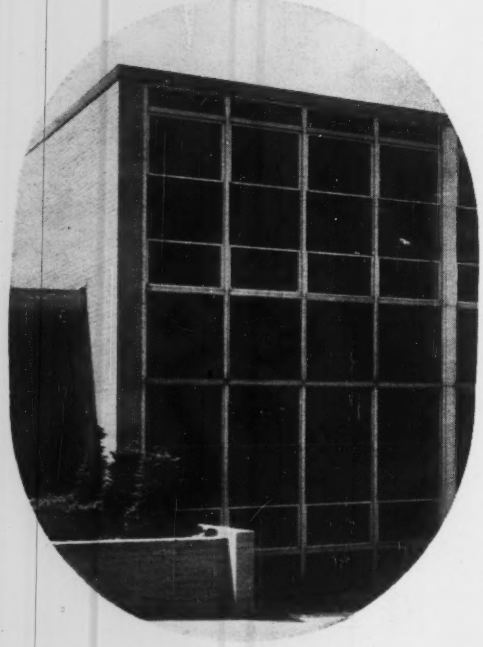
10



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You also gain substantially from this counsel of experienced curtain-wall Engineers — supported by a financially responsible organization with complete manufacturing and erection facilities — when you call in Bayley to assist on your current or contemplated projects. You will be working with a company known for other services and customer-relation policies that provide extra benefits, from the building's inception to its acceptance. Write or call. The nearest Bayley Representative will be glad to cooperate with you.

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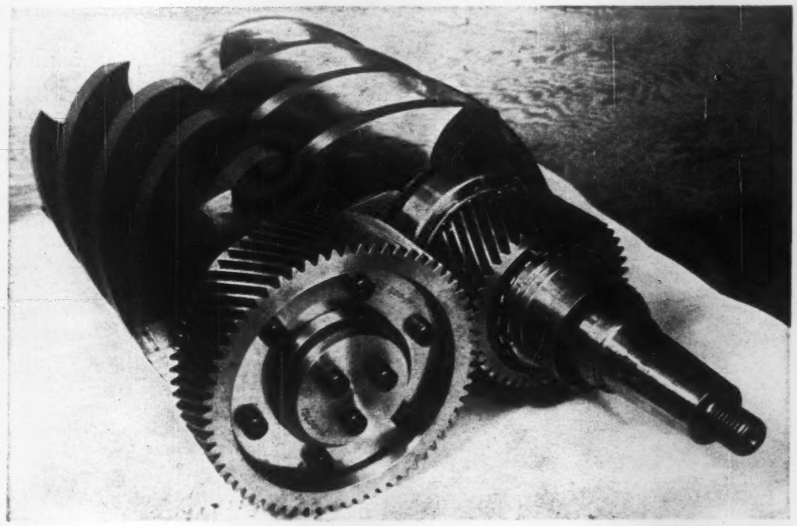


Screw Rotors Are Lungs for . . .

600
GARDNER-DENVER

A New Line of Air Compressors

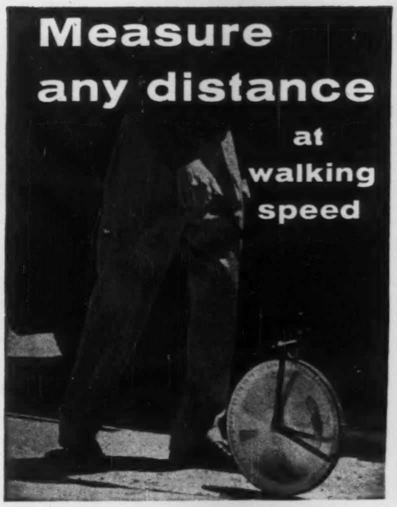
Gardner-Denver Co., Quincy, Ill., has developed three sizes of portable screw-type air compressors, called "Rota Screw" compressors, with capacities of 900 cfm, 600 cfm and 125 cfm. The company is stopping production of its vane-type rotary portable compressors, in capacities of 125 cfm to 900 cfm.

The single-stage Rota Screw compressors are designed for operation under extreme climate conditions and temperatures ranging from −40 deg to 115 deg F. The two rotors in the compression chamber are separated by timing gears. There is no metal contact within the compression chamber and consequently no wearing of parts. There are no vanes or blades to contact the cylinder. The rotors, which are made of nodular iron for strength and durability, are oil-flooded for sealing and for the removal of heat of compression.

(The use of rotor screws for compressing air is not new. Two European manufacturers, one Swedish, the other English, have been producing rotating screw-type compressors for some time. At least one American firm has been using the principle for about five years in the manufacture of fixed industrial compressors with capacities ranging from 100 cfm to 20,000 cfm, and last week this firm announced production of a portable compressor of this type in the 1,200 cfm class. See p. 37.)

The 900-cfm and 600-cfm compres-

(*Please turn the page*)



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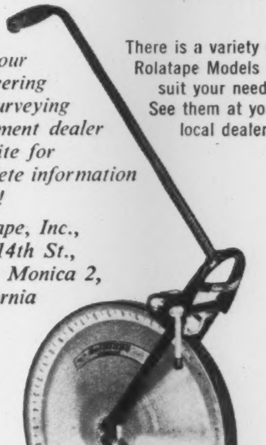
Shows Inches, and Fractions of an inch. Wheel is calibrated in inches and fractions for quick easy reading.

Shows Tenths of a foot. Wheel is calibrated in tenths on reverse side for engineers.



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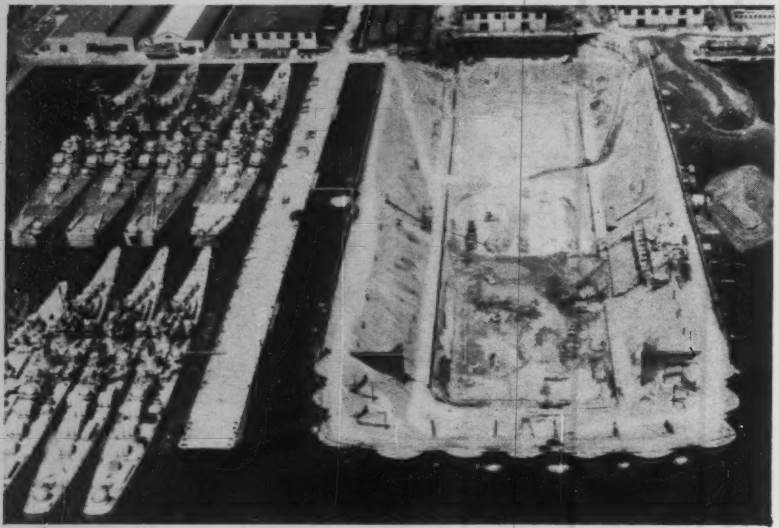
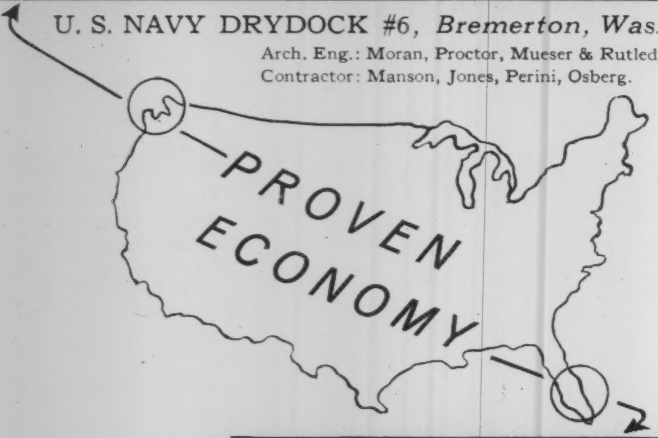


U. S. NAVY DRYDOCK #6, *Bremerton, Wash.*
Arch. Eng.: Moran, Proctor, Mueser & Rutledge
Contractor: Manson, Jones, Perini, Osberg.



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Arch. & Eng.: Connell, Pierce, Garland & Friedman.
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sors will be driven by Caterpillar Tractor Co. four-cycle D343 and D333 diesel engines, respectively. The 125-cfm compressor will be driven by a Continental Motors Corp. gasoline engine model F-226. All three will operate under a pressure of 100 psi.

Engines and compressors are protected by a fail-safe, 24-v electrical system on the diesel units, and a 12-v system on the gasoline units. If the safety units are faulty or a wire is broken or disconnected, the equipment cannot be started.

The equipment also features simplified starting and stopping. Operators turn a switch to start, flip a switch to stop.

No hand operation is needed to "blow down" the air receiver when the equipment shuts down. This is done automatically.

Glow plugs are employed to heat the air and fuel for easier starting in cold weather. Another feature of the compressors is that the air receiver, oil reservoir, and oil separator are all combined into one vessel.

A seven-pass radiator and an improved design top tank remove the air from the water that cools the compressor oil and lowers the combustion heat of the engine. It lowers the temperature of the oil from 185 deg to 155 deg F.

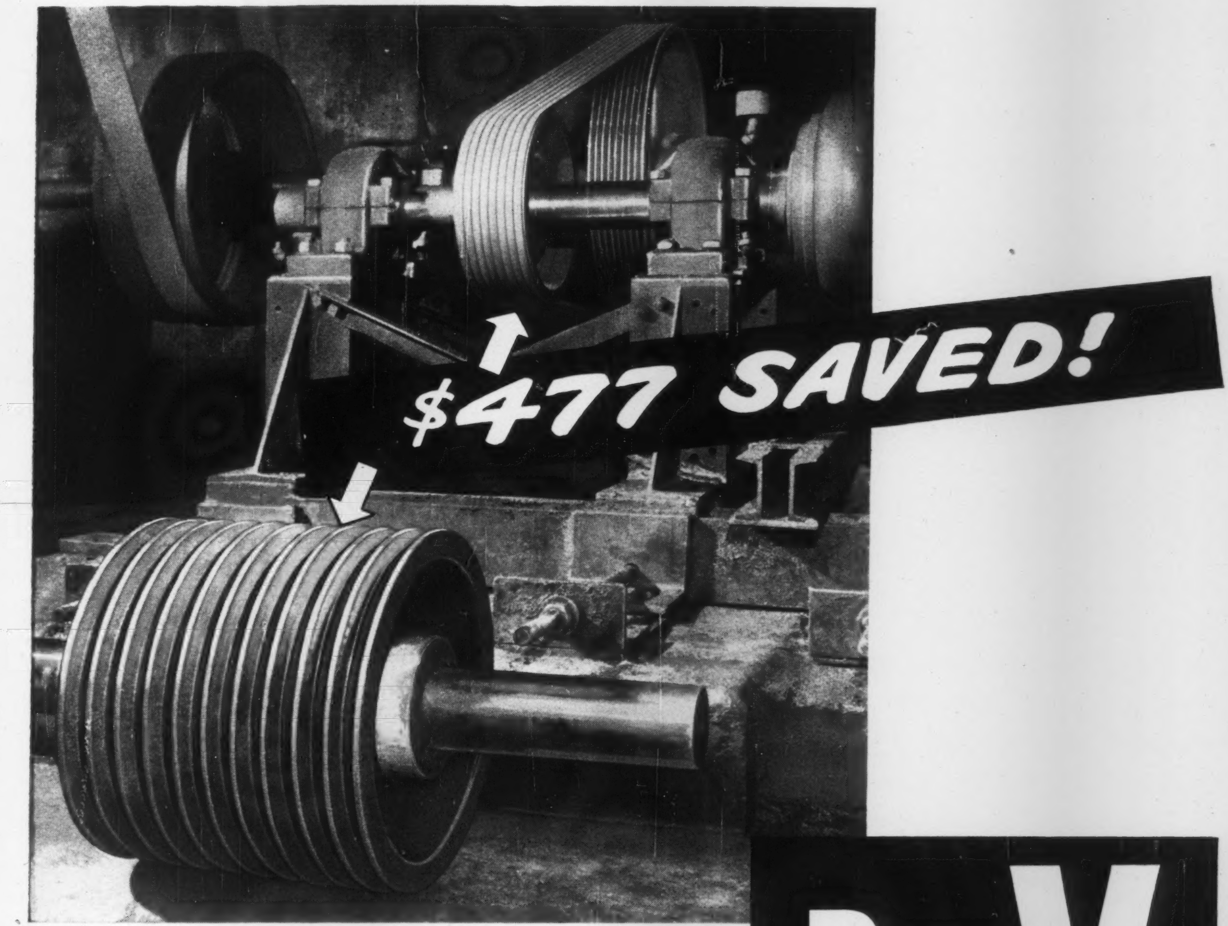
The operation of the Rota Screw compressors is simple. The heart of the machine is a twin screw mechanism containing two rotors. The main rotor, which is connected directly to the engine, drives a secondary rotor, which serves as a sealing rotor that compresses the air before discharging it into the receiving tank. About 95% of the horsepower of the engine is required to run the main rotor, and 5% for the secondary.

Although the design of the rotors is somewhat complicated, their operation in compressing air at atmospheric pressure to 100 psi is not too difficult to understand. The main rotor has four male lobes extending around its periphery in the form of threads of a screw. The secondary rotor has six screw-type female flutes around its periphery.

As the main rotor revolves, driving the secondary rotor by the timing gears, the four lobes mesh with the six flutes, somewhat similar to the action of an old-fashioned meat grinder.

This is the action that compresses the air. The air is drawn in from ports by the main rotor and is pressurized by the action of the lobes meshing with the flutes at speeds of 1,100 to 1,800 rpm.

(*Continued on p. 146*)



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SAVE SPACE, SAVE WEIGHT, SAVE MONEY!

There's a *difference*, as you can see! The 10-groove D-section sheave in the foreground is replaced with the narrow 8-groove 5-V Dyna-V sheave on the line shaft. *Same power*, in a far more compact installation, with a $477 difference in price. And big future savings in belt replacement costs!

Everyone is going Dyna-V! Thousands of installations reveal that Dyna-V performance is *even better* than promised when we first introduced this new compact drive. In medium and high horsepower ranges, savings go as high as 30%!

Dyna-V can handle 3 times as much power in the same space. Dyna-V Sheaves decrease shaft overhang, increase bearing life. And Dyna-V Belts possess *all* premium qualities. Conditions requiring static conductivity or resistance to oil, moisture and heat are met by Dyna-V's one grade—the finest. Ask your Dodge Distributor, or write us for complete drive bulletin. Dyna-V Drives are available for capacities from 1 to 1500 hp.

Dodge Manufacturing Corporation, 6900 Union St., Mishawaka, Ind.

The Products with the Pluses...

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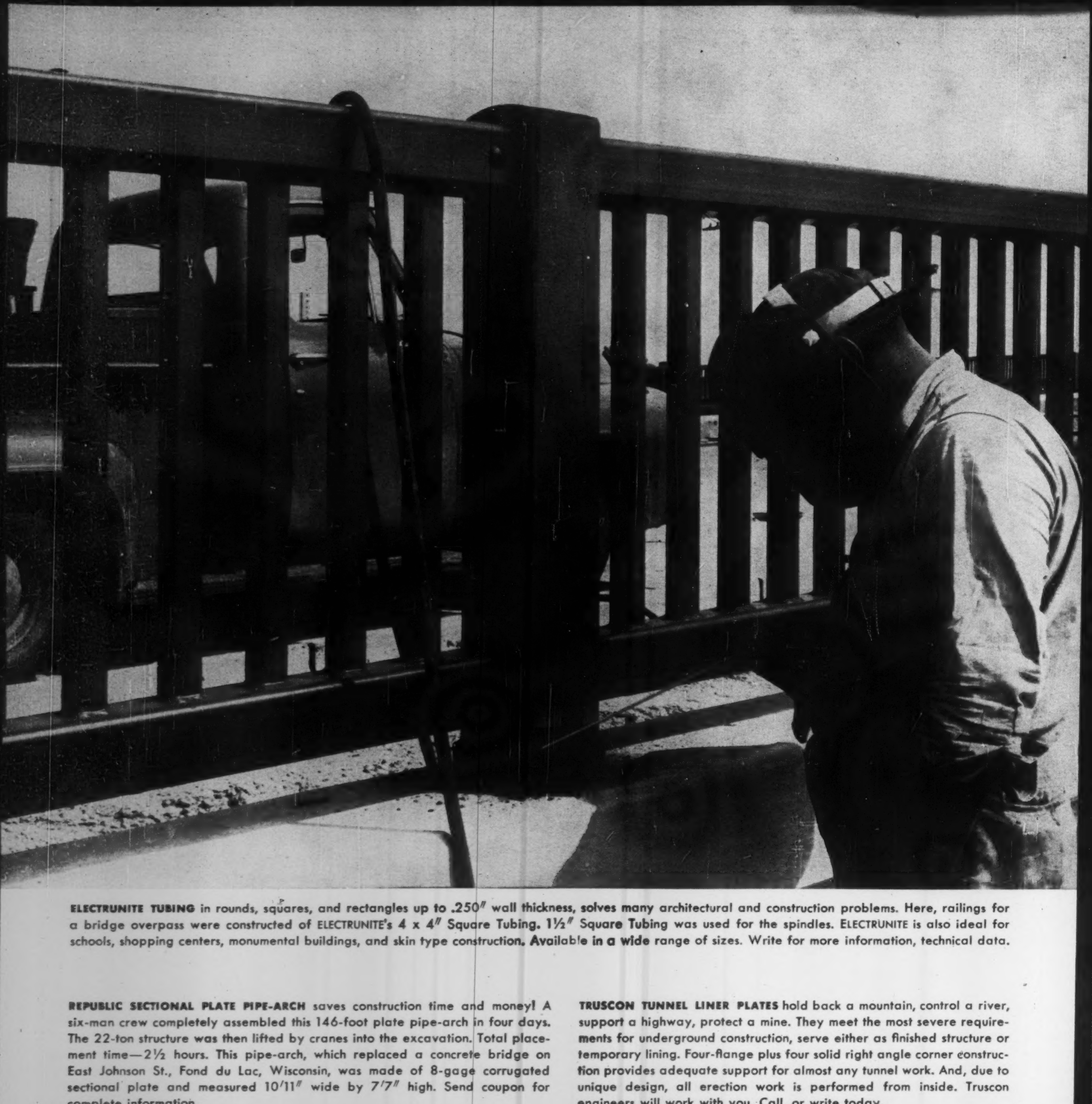
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge he can give you valuable assistance on new cost-saving methods.



ELECTRUNITE TUBING in rounds, squares, and rectangles up to **.250″ wall thickness, solves many** architectural and construction problems. Here, railings for a bridge overpass were constructed of ELECTRUNITE's **4 x 4″ Square Tubing. 1½″ Square Tubing** was used for the spindles. ELECTRUNITE is also ideal for schools, shopping centers, monumental buildings, and skin type construction. **Available in a wide** range of sizes. Write for more information, technical data.

REPUBLIC SECTIONAL PLATE PIPE-ARCH saves construction time and money! A six-man crew completely assembled this 146-foot plate pipe-arch in four days. The 22-ton structure was then lifted by cranes into the excavation. Total placement time—2½ hours. This pipe-arch, which replaced a concrete bridge on East Johnson St., Fond du Lac, Wisconsin, was made of 8-gage corrugated sectional plate and measured 10′11″ wide by 7′7″ high. Send coupon for complete information.

TRUSCON TUNNEL LINER PLATES hold back a mountain, control a river, support a highway, protect a mine. They meet the most severe requirements for underground construction, serve either as finished structure or temporary lining. Four-flange plus four solid right angle corner construction provides adequate support for almost any tunnel work. And, due to unique design, all erection work is performed from inside. Truscon engineers will work with you. Call, or write today.

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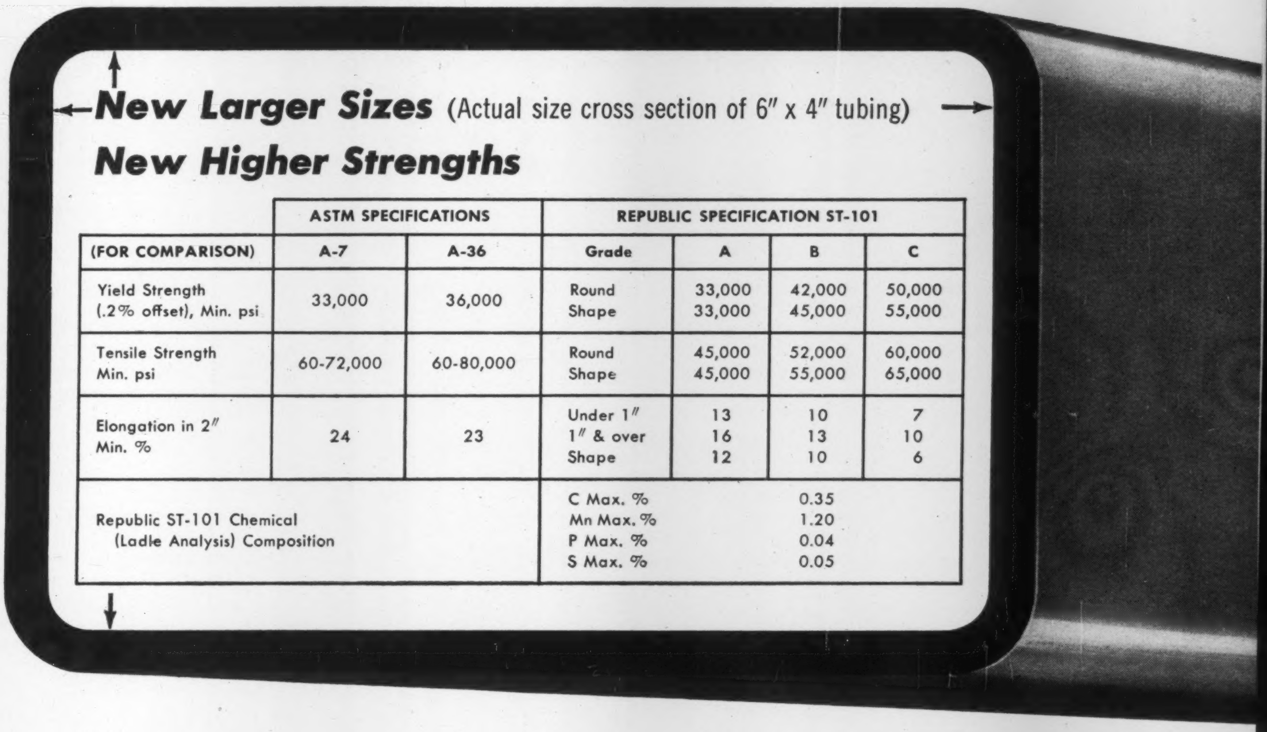

New Larger Sizes (Actual size cross section of 6″ x 4″ tubing)

New Higher Strengths

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Yield Strength (.2% offset), Min. psi	33,000	36,000	Round Shape	33,000 33,000	42,000 45,000	50,000 55,000
Tensile Strength Min. psi	60-72,000	60-80,000	Round Shape	45,000 45,000	52,000 55,000	60,000 65,000
Elongation in 2″ Min. %	24	23	Under 1″ 1″ & over Shape	13 16 12	10 13 10	7 10 6
Republic ST-101 Chemical (Ladle Analysis) Composition			C Max. % Mn Max. % P Max. % S Max. %	0.35 1.20 0.04 0.05		

Republic ELECTRUNITE Tubing is now produced to specification ST-101 in new larger sizes and greater range of wall thicknesses. It offers architects and engineers a building material with virtually unlimited freedom in design.

Smooth, unbroken surfaces of ELECTRUNITE without sharp corners or bare edges resist moisture and corrosion. ELECTRUNITE is weldable, easily joined to other members. It can be painted or furnished galvanized.

ELECTRUNITE in carbon steels is now available in 400 sizes—rounds up to 6″ O.D., squares to 5″ a side, and rectangular sizes in peripheries to 20 inches; in stainless steel sizes to 5″ O.D., in square and rectangular peripheries to 16 inches.

Steel

Strong, Modern, Dependable

REPUBLIC HIGH STRENGTH BOLTS CUT CONSTRUCTION TIME! Project: 850-foot continuous span overpass, West 140th Street, Cleveland, Ohio. Job completed, bridge in service in just nine months, three months ahead of schedule! According to the contractor, Hunkin-Conkey Construction Company, Cleveland, "Republic High Strength Bolts helped speed erection, kept costs down." Get the complete story of the advantages of Republic High Strength Bolts. Call your Republic representative, or send coupon.

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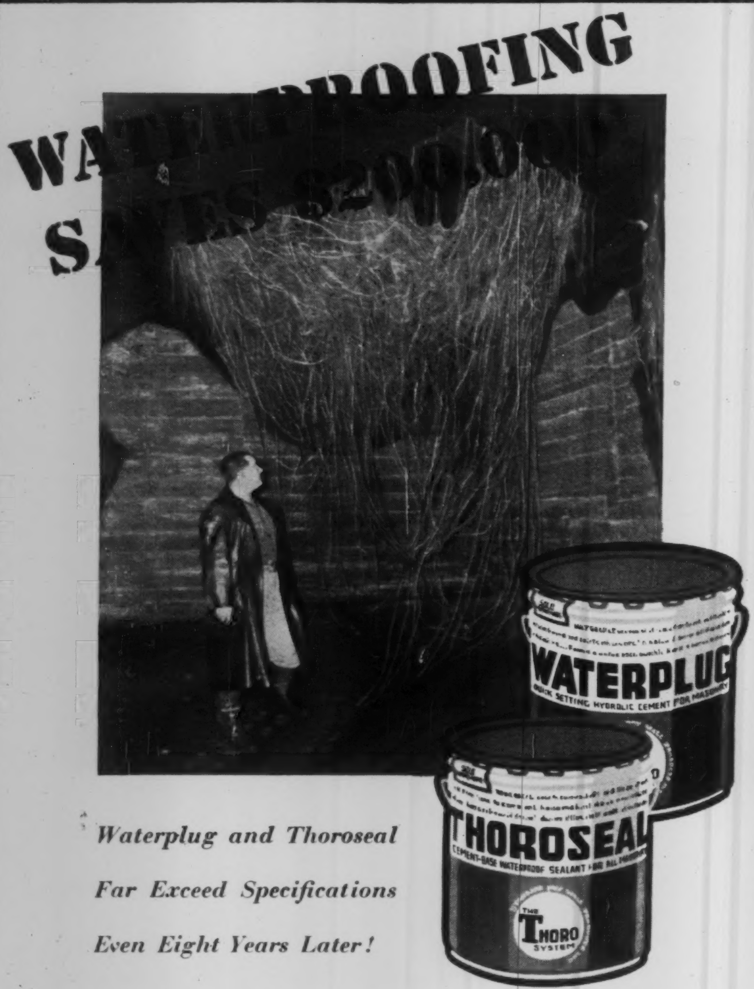
CIRCLE 145 ON READER SERVICE CARD



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Far Exceed Specifications

Even Eight Years Later!

Eight years ago this 10,000,000 gallon underground reservoir was wasting some 1,750,000 gallons a day through leaks, cracks, and actual consumption by huge invading root formations. On test, water level dropped 3 feet 2 inches during a 24-hour period.

Waterproofing specifications: maximum drop of 1" in 24 hours. Process: After draining and cleaning the reservoir, Waterplug hydraulic cement was forced into cracks. All running leaks stopped instantly. Next: A sealer coat of waterproof cement-base Thoroseal was brushed onto walls, and out onto the floor for 3'. A second coat of Thoroseal was applied 24 hours later.

Only 3/8" drop in water level after 24 hours, new test showed! (In the arched 2,000,000 cu. ft. structure, evaporation accounts for around that much.) Regular tests since show the same high performance continues today, way above specifications! Estimated savings to date: nearly $200,000, and still going on.

- Let The Thoro System help you save on *your* waterproofing problems—above grade or below, in new construction or renovation. Specify masonry specialties with top performance records since 1912. Write for complete Specifications Guide: to all these Thoro products.

STANDARD **DRY WALL** PRODUCTS, INC.
DEPT. E-1, NEW EAGLE, PENNSYLVANIA

For the tremendous amount of compressed air produced by the rotors, they are relatively small and compact. In the 900-cfm compressor, the rotors are 19 in. long and spaced 8.6 in. c-c. The main rotor is 11.24 in. in diameter, and the secondary rotor 10.38 in. Similarly, the rotors of the 600-cfm compressor are 17 in. long, 7.5 in. c-c with diameters of 9.75 in. and 9.00 in., respectively.

Rotors of the 125 cfm compressor are 10.25 in. long and are spaced 4.6 in. c-c, with diameters of 6.03 in. and 5.56 in., respectively.

At all operating speeds, the secondary rotor rotates only two-thirds as fast as the main rotor. At top speed, for example, when the main rotor and the engine drive-shaft are operating at 1,800 rpm, the secondary rotor is running at 1,200 rpm.

Research got under way in July 1959 with the conception of the profile, or cross-section, of the rotor screws of the compressors. In developing the three initial sizes of screw-type portable compressors, Gardner-Denver research and development engineers assembled and thoroughly tested prototypes of all three models. Production models were then assembled for all three compressers.

These production models went through even more rigorous shakedown tests under simulated field operations. Each model was operated over 1,000 hours, part of which was in a special heated room where the temperature reached 125 deg F.

The 900 cfm compressor will have an operating weight of 15,100 lb.; the 600 cfm model, 10,150 lb.; and the 125 cfm model, 3,150 lb.

Working in conjunction with Gardner-Denver's engineers, Caterpillar engineered the two six-cylinder diesel engines to fit the requirements of the compressors. The D343 engine, which is also used in the Caterpillar 630 and 631 wheel tractor, was announced to the construction industry February 1. Caterpillar's D333 engine also provides power for the D6 tractor, the No. 12 and No. 14 motorgraders, and the 966 Traxcavator.

In engineering the two engines to fit the specific requirements of the compressors, some modifications were required. These included a trunnion front support for the two engines to permit hauling over rough terrain without inducing severe stresses in the mounting. An automotive flywheel mounting, which is a side mounting, is used to provide more clearance beneath the flywheel for operating lines of the compressors.

(*Continued on p.* 148)

250,000 BBL. FUEL TANK SEALED BY HALLIBURTON GROUTING

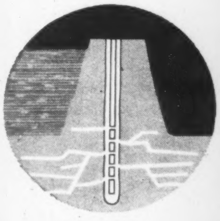
Uncontrolled water flow was entering this 250,000 bbl. LPG underground storage cavern through fissures — some as wide as ¼″ — in the ceiling and sides of the cavern during its excavation.

To stop this troublesome water problem, the mining engineer called on Halliburton Pressure Grouting Service. Since prior grouting jobs using conventional materials and methods had failed to stop the water flow, Halliburton recommended treatments with HYDRO-LOK (PWG). This is a low-viscosity chemical grout with a controlled fluid time, allowing it to reach the water bearing zones. It then sets very quickly to form a stiff gel effectively sealing off the flow of water.

Some 600 separate injections of HYDRO-LOK (PWG) were made, varying from 3 gallons to 800 gallons each. A total of 7,946 gallons of HYDRO-LOK (PWG) and 736 gallons of Halliburton Hydromite was pumped into the fissures existing throughout the cavern. After 33 working days, more than 95% of the water flow had been stopped.

If you have an underground water problem, call on Halliburton to help you solve it. Contact the Halliburton Division Office nearest you, or write direct to:

Halliburton is financially able to perform any size grouting operation as a prime or sub-contractor.



PRESSURE GROUTING SERVICES

Halliburton
COMPANY • DUNCAN, OKLAHOMA

CIRCLE 147 ON READER SERVICE CARD

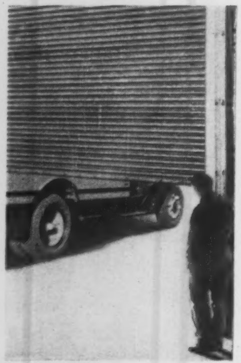
REGISTERED
KINNEAR
ROLLING DOORS
steel or aluminum

Your New 1961 Data on . . .

Kinnear Rolling Doors

and rolling grilles, counter shutters and fire doors

In any doorway, Kinnear provides an unbeatable combination of lower door costs, extra protection and higher efficiency. Kinnear's upward-acting curtain of interlocking slats (originated by Kinnear!) coils compactly above the opening. All space *around* doorways is fully usable at all times. The curtain opens completely out of the way, closes to give you a rugged all-metal curtain of protection against wind, weather, fire, and vandals. 50 years *and more* of continuous, daily, low-maintenance service have been recorded for many Kinnear Rolling Doors. They're also REGISTERED — all parts of every Kinnear door can always be accurately duplicated from master details kept permanently in fireproof vaults. Get all these Kinnear Rolling Door benefits and more; write for this new 1961 catalog.



The KINNEAR Manufacturing Co.
FACTORIES: 1820-40 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, California
Offices and Agents in All Principal Cities

Caterpillar also provided a top-mounted turbocharger, rather than the rear mount used on the industrial model engines.

This keeps the heat of the turbocharger farther away from the intake of the compressor, and makes it a cleaner installation. Engine timing was designed to provide peak performance at the 1,800 rpm speed of operation of the compressors.

The engines are operated by a modulating control, governed by the compressors. It regulates the engine speed with the load demand, thus giving maximum fuel economy, according to Caterpillar engineers.

Both engines are connected directly to the Roto-Screw compressors through flexible couplings. No disconnect clutch is required since the compressed air tank is automatically unloaded when the unit is shut down. The engine never starts against a load.

Standard equipment on both engines are electric glow plugs in the precombustion chamber.

The operator switches on the 24-volt electric power and waits a minute or two to warm the air in the combustion chamber before starting. Ether starting aids are also standard for quick starts at below zero temperatures.

When operating the compressors, both engines have a top speed of 1,800 rpm and 1,100 rpm on the lower, cutoff speed. Both engines are designed to operate at about 2,000 rpm as industrial engines.

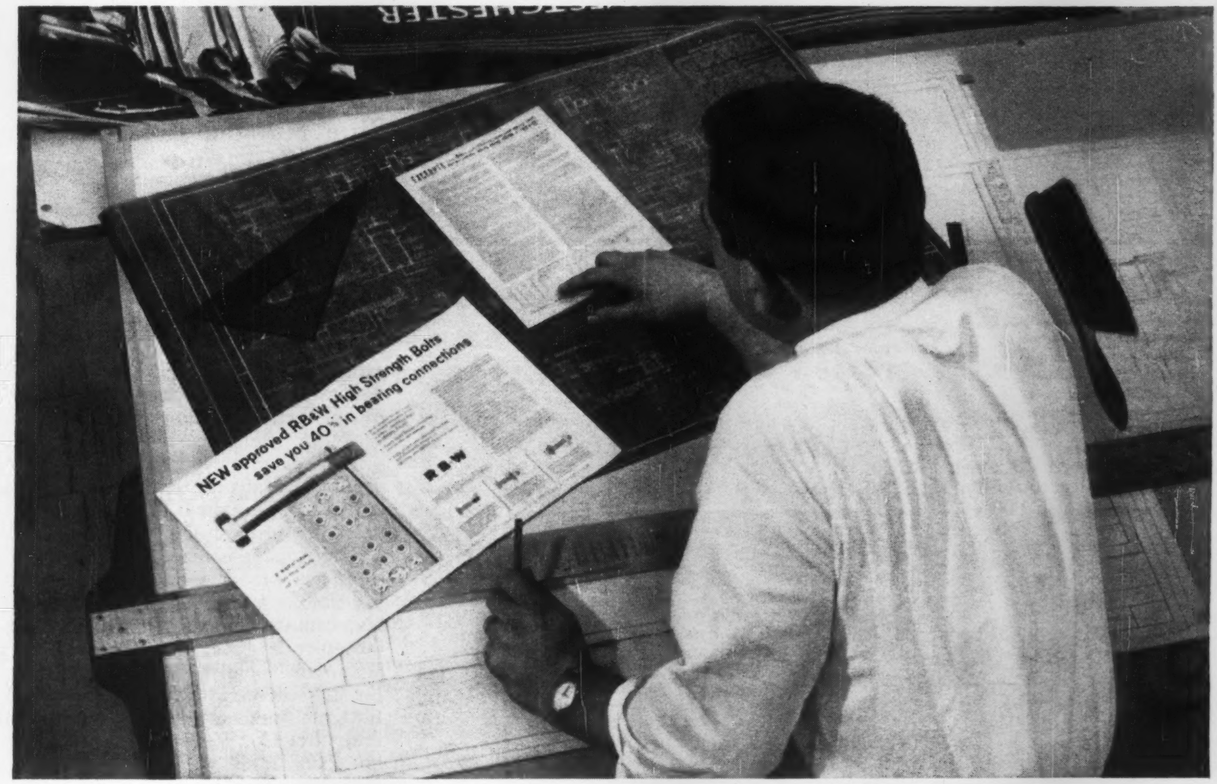
In engineering the two engines for compressor use, the turbochargers were sized to provide full horsepower rating at altitudes as high as 7,500 ft and 12,000 ft, without derating. And finally, the engines are equipped with a heavy-duty type dry air cleaner for operating in dusty conditions. GARDNER-DENVER CO., QUINCY, ILL.

Latest Trojan Shovel Can Lift 15,000 lb

The most recent addition to the Trojan line of tractor shovels is the Model 254, a machine with a 15,000-lb lifting capacity and a 2- or 3-cu-yd bucket capacity. The 254 embodies full power shift transmission, planetary axles, power steering and air powered hydraulic brakes on all four wheels.

Approximate weight is 24,500 lb and overall length is 20 ft. The machine can move over the road at speeds up to 24 mph with power supplied by either gasoline or diesel engine. A full line of attachments is also available. TROJAN DIV., YALE & TOWNE MFG. CO., BATAVIA, N. Y.

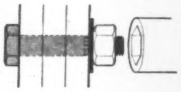
(*New Products continues p. 150*)


NEW approved RB&W High Strength Bolts
save you 40% in bearing connections
RB&W

Structural engineers see new way to reduce cost of steelwork

An important change in the specification for structural joints permits a designer to work out economies in shop assembly and field erection costs right at his board.

No longer does the specification consider high strength bolts and rivets equal, except in friction-type joints. In the predominant bearing-type joints, the tensile/shear ratio is changed to take advantage of the new large-head short-thread bolts. Two of these do the job of three rivets; or replace three of the regular high strength bolts. Their short thread length excludes shear planes from passing through a threaded section. Thus, the full shank section is available to develop specified shear strength.



Moreover, only *one* hardened washer is used . . . under head or nut, whichever is torqued in tightening. Obviously, by eliminating one-third the holes, one-third the bolts or rivets, and one-half the washers, shop fabricators can save up to 40% on connections. Field erectors can realize savings similar to these.

But these savings won't be completely realized, and reflected in lower costs, until *the designer puts this new fastening improvement to work.*

So, if you're a structural engineer, plan now on the economies in the new RB&W High Strength Bolt. And if you're a fabricator or field erector, count on a full size range of these bolts from RB&W . . . all with traditional RB&W quality and certified conformance to ASTM A325 specification. For more data, write Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W
116th year

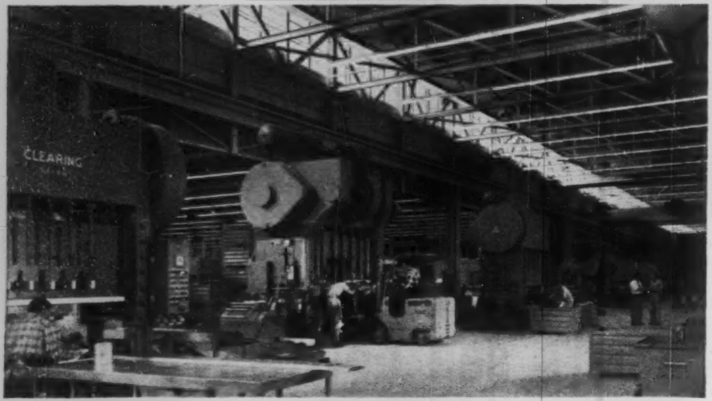
Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Sales office and warehouse at: San Francisco, Calif. Sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas. Sales agents at: Cleveland; Milwaukee; New Orleans; Denver; Fargo.

LARGEST INDEPENDENT PRODUCER OF HIGH STRENGTH BOLTS FOR CONSTRUCTION

CIRCLE 149 ON READER SERVICE CARD

13,500 sq. ft. of 1/8" Luxlite Coolite Heat Absorbing Glass, Glare Reduced one side, has been installed in plant of Cutler Hammer, Inc., Lincoln, Ill., pioneer electrical manufacturer. Design and construction by The Austin Company.

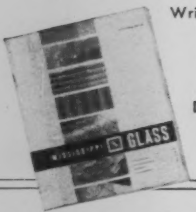
MISSISSIPPI GLASS *tailors light* TO SUIT YOUR NEEDS

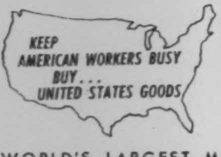


The property of light diffusion in translucent glass by Mississippi is one of the most useful tools available to engineers and architects. Rooms can be adequately daylighted far from windows; small skylights can cover large expanses of floor space with shadowless daylight; privacy can be secured . . . light controlled. Working hand-in-glove with modern daylighting practice, Mississippi glass reduces contrast that results in costly visual errors . . . keeps interiors more comfortable.

With Coolite, Heat Absorbing glass, occupants see better . . . feel better . . . work better. Coolite and a wide variety of other patterns, wired and unwired, are available at your quality glass distributor. See him today.

Write today for new catalog. Address Dept. 20.





MISSISSIPPI GLASS COMPANY
88 Angelica St. • St. Louis 7, Missouri
NEW YORK • CHICAGO • FULLERTON, CALIFORNIA
WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

One-Piece Sound Damper, Pipe Hanger Cuts Costs

A line of combination pipe hangers and sound isolators is designed to be used with both standard pipe and copper tubing sizes ranging from 3/8 in. to 6 in. Unit construction of the sound isolator and hanger at the factory cuts down on field-labor costs.

The isolator, the manufacturer states, eliminates the sound and vibration generated by expansion, contraction, or flow of liquids, or by mechanical equipment such as pumps, compressors, valves or regulators.

The isolator prevents the transmission of vibrations to the building structure; it also can be used to eliminate the possibility of electrolytic action.

The isolator is made of a galvanized sheet metal cover, formed with reinforcing ribbing and a chemically processed high-compression felt permanently attached to its cover. Special stainless or aluminum metal covers can be made for use wherever high corrosive conditions are found to exist. ELCEN METAL PRODUCTS CO., 9333 KING ST., FRANKLIN PARK, ILL.

Light Gage Guardrail For Off-Highway Use

Econo-Beam is a light gage, galvanized guardrail for off-highway use. According to its manufacturers, it is excellently suited for parking lots, plant and factory driveways and other low-impact applications.

Econo-Beam is fabricated from a 16-ga steel (as opposed to a more expensive 12 ga steel used in highway barriers) and is available in 12½- and 25-ft lengths.

Splicing of sections is achieved by insertion of four bolts and a single bolt holds the rail to any timber, concrete or steel post. ARMCO DRAINAGE & METAL PRODUCTS, INC., 9360 CURTIS ST., MIDDLETOWN, OHIO.

Mixer Blends Radioactive Wastes Into Concrete

"Atomic" concrete is the product of a specially designed concrete mixer used in preparing radioactive wastes for disposal.

Concrete and radioactive wastes are mixed in the machine, then poured into steel drums and disposed of at government-approved sites.

All mixer parts that come in contact with the radioactive materials are stainless steel. Remote control features are incorporated into the unit. T. L. SMITH CO., 2835 N. 32ND ST., MILWAUKEE, WIS.

Two portable air compressors with multi-drill rigs speed drilling for 30-inch gas line stretching from Texas to California.

World's Largest Rotary Compressors Ram a Pipeline Through the Desert!

Burying a pipeline from Texas to the West Coast calls for a tremendous ditching job — much of it in tough, rocky desert terrain. On the Arizona stretch, the contractor, H. C. Price Co., chose the most powerful equipment available to punch through the pipeline as quickly and economically as possible.

Two Le Roi 1200 Rotaries — the largest portable compressors made — are each teamed up with a crawler-mounted Le Roi 4-drill rig to do blast-hole drilling. Each rig simultaneously drills four 2¼-inch blast holes to a depth of six to eight feet, depending on terrain formation. The 1200 portable compressor and 4-drill rig combination saved time and manpower.

The Le Roi 1200 Rotary delivers a full 1200 cfm of free air at 100 psi — enough power to meet your biggest demands. The compact powerhouse has an 18 foot turning radius, and meets all existing state highway regulations.

It's also the most flexible compressor on the market. Twin-unit design gives you two 600 cfm compressors that you can operate together for 1200 cfm or separately for 600 cfm of air. You can shut one unit off when air demand falls below 600 cfm, or for servicing without disrupting work. When air requirements are below 600 cfm, you can alternate use of units to equalize compressor life. What's more, interchangeable engine and compressor parts simplify servicing and protect you against costly emergency shutdowns in the field.

Ask your local Le Roi distributor for more information. Or write directly to Le Roi Division, Westinghouse Air Brake Co., Sidney, Ohio.

PC-011

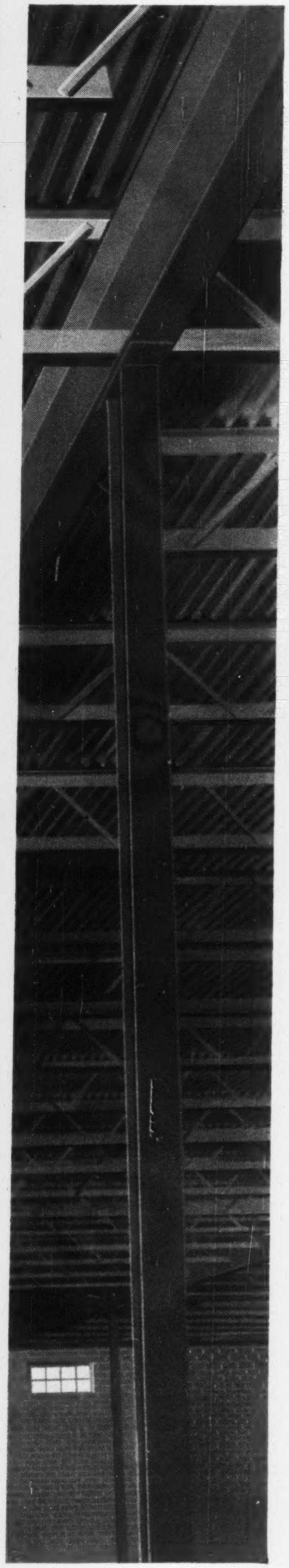
LE ROI ROTARY COMPRESSORS

PORTABLE AND TRACTAIR® AIR COMPRESSORS • STATIONARY AIR COMPRESSORS • AIR TOOLS

Wheeling
CORRUGATING COMPANY

TENSILFORM® BY WHEELING

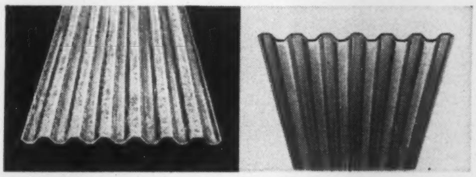
Tensilform complies fully with American Iron and Steel Institute's Design Manual for Light Gauge Structural Shapes (1960 Edition).



Big, wide, wonderful open space!

There's a light, airy look about buildings that have roofs of Tensilform and lightweight aggregate fill.

That's because exceptionally strong Wheeling Tensilform permits fewer, lighter roof supports . . . and Wheeling's *all-new* design provides excellent lateral stability for all types of structures.



USE TENSILFORM AS A CEILING, TOO! The long, angular lines of Tensilform make nearly any building look more expansive.

More than that, galvanized Wheeling Tensilform, combined with either conventional or light aggregate concrete, gives you roofs with:

Excellent "U" factors at low initial costs.

Lower fire and extended coverage ratings.

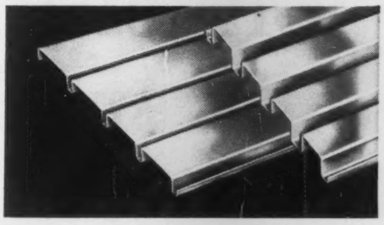
Earlier occupancy because shoring isn't needed . . . and Tensilform can be installed even in freezing weather.

Cleaner construction because precision-formed Tensilform cuts cement seepage at *both* lateral and end joints.

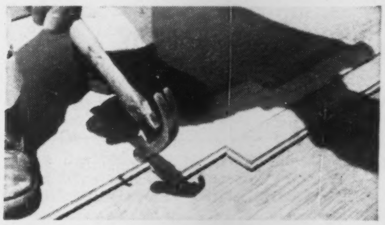
Get the full story on Wheeling Tensilform for roof and floor slabs from our catalog in Sweet's. Or write to the Wheeling Corrugating Company, Wheeling, W. Va.

Steel

WHEELING PRODUCTS INCLUDE:

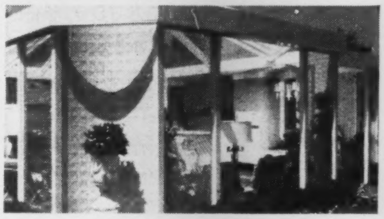


STEEL ROOF DECK – For use with conventional built-up roofs. Like Tensilform, Wheeling Steel Roof Deck goes on fast in all weather . . . can be field-painted the color you specify. Made of Cop-R-Loy® steel for extra-long life.



LABELLE CUT FLOORING NAILS – Unexcelled for laying tight, quiet hardwood floors because the nail corners cut wood fibers . . . make them work like fish-hook barbs.

METAL LATH – A complete line of expanded metal laths and lath accessories for all plaster applications.



EXPANDED METAL – Stronger than the steel from which it's made, Wheeling Expanded Metal is widely used as a decorative material . . . and wherever free passage of light, air, heat or liquids is required.

WHEELING CORRUGATING COMPANY · IT'S WHEELING STEEL!

Immediate delivery on all stocked items from these warehouses: ***Boston, Buffalo, Chicago, Columbus, Detroit, Kansas City, Louisville, Minneapolis, New York, Philadelphia, Richmond, St. Louis.*** **Sales Offices:** ***Atlanta, Houston, New Orleans.***

CIRCLE 153 ON READER SERVICE CARD

Link-Belt's creative answer to a critical problem:

"Big-city" sewage processing on a small-capacity scale

BIO-PAC

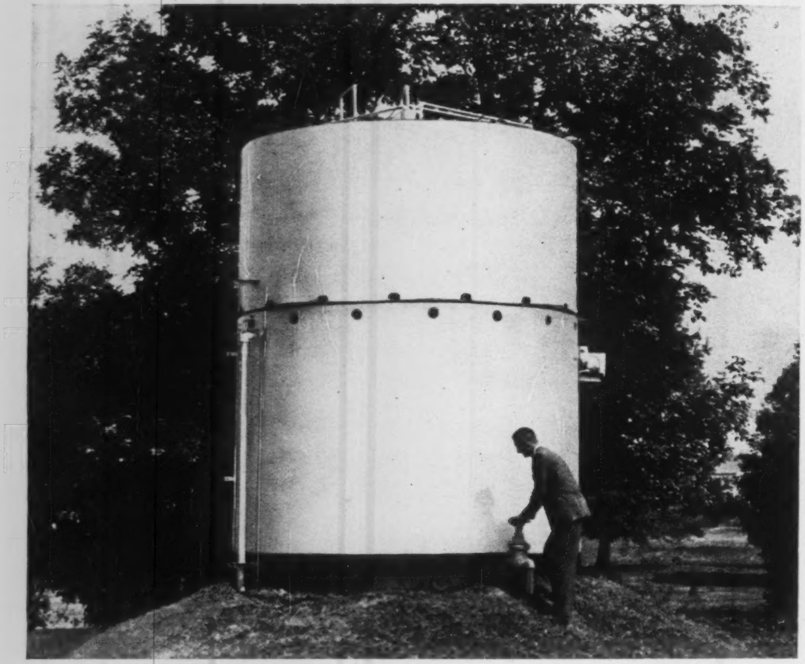
single-unit sewage treatment replaces old-fashioned disposal methods with modern, fully automatic processing

With the population spread proceeding at a rapid pace — with antipollution regulations increasing at a comparable rate — outlying areas face obsolescence of traditional sewage disposal methods.

Housing developments, industrial plants, shopping centers, schools and institutions, motels and trailer courts—all must cope with the problem of updating their methods of sewage disposal. And Link-Belt's practical answer to this problem is Bio-Pac—a modern, compact, bio-filtration sewage treatment system, designed to operate efficiently, and at low cost, in areas remote from metropolitan sewerage service.

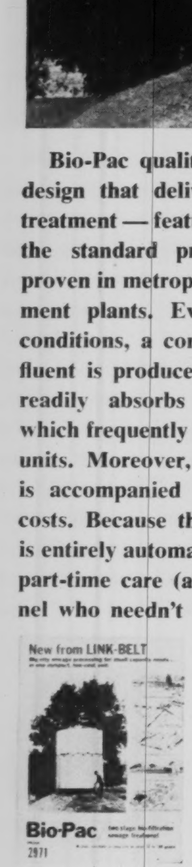
Bio-Pac is a result of specialization —40 years of Link-Belt experience, working closely with consulting and municipal engineers, in the design and construction of industrial and metropolitan sewage treatment equipment.

As a result of this specialization, Bio-Pac represents a functional scaling down of large-capacity plant concepts. Single units are available in capacities to handle the sewage needs of 50 to 500 people. And this scaling down is a matter of size alone—no compromise of quality. Every Bio-Pac unit is a complete bio-filtration system . . . built to meet the Ten State Standards for sewage works.



Bio-Pac quality is underlined by design that delivers full two-stage treatment — featuring bio-filtration, the standard process, tested and proven in metropolitan sewage treatment plants. Even under adverse conditions, a consistently stable effluent is produced. And the system readily absorbs the shock loads which frequently upset aeration-type units. Moreover, high performance is accompanied by low operating costs. Because the Bio-Pac process is entirely automatic, it calls for only part-time care (and this by personnel who needn't be highly trained).

The remarkable overall compactness of the Link-Belt Bio-Pac offers a two-way bonus in terms of flexible installation. For example, consider the 11′-6″ diameter unit illustrated above (designed to serve 150 people). As shown, height above ground is just 13 feet. Compact? Of course! But with pit installation, even greater "hide-away" possibilities can be obtained—above-ground height of only 5 feet 7 inches. It all adds up to this welcome fact . . . Bio-Pac can be made to blend with its surroundings as easily as the familiar water storage facilities.



New from LINK-BELT

Bio-Pac

2971

FREE FOLDER 2971 tells the story of Bio-Pac in detail. Contact the nearest Link-Belt office for your copy.

LINK-BELT

SANITARY ENGINEERING EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. Sanitary Engineering Regional Offices—Atlanta, Chicago 9, Colmar, Pa., Kansas City 8, Mo., San Francisco 24. District Sales Offices in All Principal Cities. Export Office, New York 7. Representatives Throughout the World. 15,599

Men and Jobs

Corps Fills Civil Works Post

Wendell E. Johnson, chief of engineering for the Missouri River Division, will be the new chief of engineering for civil works in the Office of the Chief of Army Engineers starting early next month. He fills the post left vacant by the retirement of Francis B. Slichter (ENR Feb. 9, p. 51).

Wendell E. Johnson

Mr. Johnson graduated from the University of Minnesota in 1931 with a B.S. Degree in Civil Engineering and joined the Corps of Engineers two years later. After two years with the St. Paul District, he was assigned to the Conchas Dam in New Mexico and later to the John Martin Reservoir in Colorado.

He left the Corps in 1940 to work on the Third Locks Project of the Panama Canal, serving first on design and later as chief of construction. In World War II, Mr. Johnson enlisted as a private and in two years rose to the rank of major in the European Theater.

On leaving the Army in late 1945 he rejoined the Corps of Engineers, shortly thereafter becoming chief of the engineering division in the Omaha District Office. He was transferred in the spring of 1949 to chief of the engineering division of the Missouri River Division with headquarters still in Omaha. There he supervised the Corps' Missouri River development program and a large military construction program for the Army and the Air Force.

Mr. Johnson is a past president of the Nebraska Section of the American Society of Civil Engineers; a consultant to the government of Canada on engineering for the South Saskatchewan River Project; a member of the U.S. Committee of the International Commisison on Irrigation and Drainage; and a member of the U.S. Committee on Large Dams.

Engineers Merge for Foreign Work

Seven U. S. engineering firms, each with a different specialty, have joined to form a new organization called American Engineering Consultants, Inc. The consortorium will handle jobs that would have been out of the reach of the firms individually. The group will seek out foreign engineering assignments collectively, but each firm will continue its U. S. practice in its own specialty as before.

Managing director of the new firm is Hunter Hughes, who resigned last month as editor of CONSULTING ENGINEER to take the post. He will make his headquarters in Washington, D. C. Other officials in the consortium have not been announced.

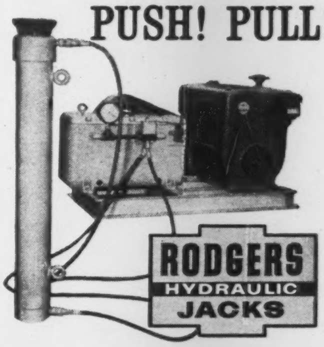
The member firms and their specialties are: Bosch & La Tour, Cincinnati, electrical and mechanical engineering; Dames & Moore, Los Angeles, earth sciences; Duffill Associates, Boston, general civil engineering; Ralph Katzen, Cincinnati, chemical engineering; Ketchem, Konkel & Hastings, Denver; structural engineering; Toman Engineering Co., Mandan, N. D., sanitary engineering; and Wilbur Smith & Associates, New Haven, Conn., traffic and economic studies.

Illinois Traffic Engineer Retires After 52 Years

Harry B. Harrison, engineer of traffic in the Bureau of Traffic of the Illinois Division of Highways, has retired after 52 years of almost continuous service to the state. He joined the division in 1919 after World War I service in the Engineers, and has worked for the state with no other interruption than a three-year hitch in World War II.

Recognized as an authority on traffic problems, Mr. Harrison has served on committees of the National Safety Council, American Association of State Highway Officials, the Highway Research Board, the Institute of Traffic Engineers and the Illinois Traffic Safety Commission.

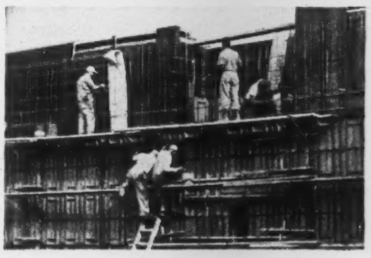
LIFT! PRESS!
PUSH! PULL!



You'll find RODGERS Hydraulic Jacks on nearly every construction project because of their easy adaptability to any heavy lifting, pulling, or pushing job. Use RODGERS jacking cylinders singly or in groups. You'll get steady, precisely-controlled power to jack steel casing, corrugated pipe, or compressed concrete tile. And you can use them to raise bridges, lift buildings, prestress concrete. *Available for immediate delivery*, with cylinder capacities of 50 to 600 tons, hand operated or power driven. *Get full details.*
J-100D

RODGERS HYDRAULIC, INC.
Pioneer in high-pressure Hydraulics, since 1932
7401 Walker St. • Minneapolis 26, Minnesota

CIRCLE 27 ON READER SERVICE CARD



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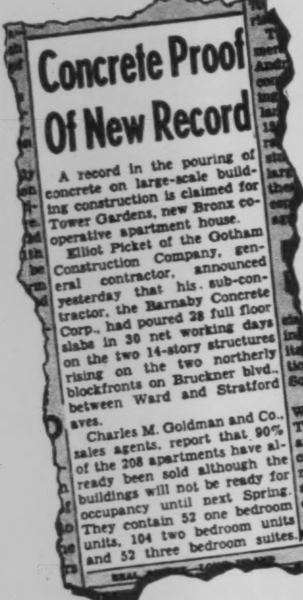
CIRCLE 155 ON READER SERVICE CARD



Concrete Proof Of New Record

A record in the pouring of concrete on large-scale building construction is claimed for Tower Gardens, new Bronx co-operative apartment house.

Elliot Picket of the Gotham Construction Company, general contractor, announced yesterday that his sub-contractor, the Barnaby Concrete Corp., had poured 28 full floor slabs in 30 net working days on the two 14-story structures rising on the two northerly blockfronts on Bruckner blvd., between Ward and Stratford aves.

Charles M. Goldman and Co., sales agents, report that 90% of the 208 apartments have already been sold although the buildings will not be ready for occupancy until next Spring. They contain 52 one bedroom units, 104 two bedroom units and 52 three bedroom suites.

as reprinted from
N. Y. Journal American, August 14, 1960

SYLGAB
CONCRETE ACCESSORIES
HELPED MAKE THIS SPEED RECORD POSSIBLE

News was recently made by the record-breaking pouring of concrete for the Tower Gardens, a new cooperative apartment house in the Bronx by Barnaby Concrete Corp. SYLGAB bar supports, used in this job, contributed to this accomplishment.

TOWER GARDENS

Manor Avenue and Bruckner Boulevard
The Bronx, New York City

GOTHAM CONSTRUCTION CO., Contractor
BARNABY CONCRETE CORP., Sub-contractor
BROWN & GUENTHER, Architects

★

Major time-saving advantages are afforded by SYLGAB products: they are designed for instant installation; they permit fast pouring due to high rigidity. In addition, SYLGAB's reputation for delivering "the right material at the right time" assures perfect coordination with construction timetable.

★

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BEAM CLIPS • SPECIAL COLUMN CLIPS
EXPANSIBLE CLIPS
STRAIGHT AND COIL WIRE
HAIRPIN CLIPS • TOGGLE HANGERS
FORM SPACERS • BAR ACCESSORIES

Briefs . . .

Business

Michigan Associates, consulting engineers headquarters in Lansing, Mich., has changed its name to John R. Snell Engineers, Inc. Principals of the firm are **John R. Snell**, president; **John M. Fairall**, vice president; **William G. Turney**, treasurer; and **William T. Harvey**, secretary. The firm will continue to specialize in municipal and industrial engineering services.

George J. Tupac, formerly a civil engineer with the City of Los Angeles, will represent the National Corrugated Metal Pipe Association as Division Engineer in Los Angeles.

J. Donald Rollins has been appointed president of the American Bridge Division of U. S. Steel Corp. replacing **Austin J. Paddock**, who becomes administrative vice president of fabrication and manufacture of the parent company. Mr. Rollins, a 25-year veteran with U. S. Steel, studied engineering at Carnegie Institute of Technology and Armour Institute of Technology.

Robert M. Egelhoff has resigned as president of New England, New York and Eastern Lift Slab companies to join Ley Construction Co. as manager of their Hartford, Conn. office.

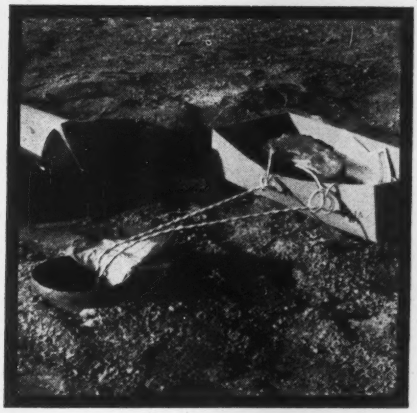
Charles Luckman Associates, Los Angeles and New York planning, architecture and engineering firm, has admitted two more architects: **Ben H. O'Connor**, former designer and project architect for Benjamin H. Marshall, Chicago; and **Maynard D. Houston** former director of planning in the Aetron Division of Aerojet General Corp.

A San Francisco office has been opened by T. Y. Lin & Associates, Los Angeles consulting structural engineers specializing in prestressed concrete. Heading up the new office is **Felix Kulka**, who has been an associate of the firm since 1955. Mr. Kulka has concentrated on lift slab and thin shell concrete work.

The Austin Co., Cleveland engineers and builders, has made vice presidents of **E. W. Hollister**, manager of the Cleveland district and **Charles R. Wing**, manager of the company's southwest district.

George A. Sargent, an executive of the Pennsylvania Railroad for 22 years, has joined Ford, Bacon & Davis Inc., a New York firm of engineering and management consultants, as a senior engineer.

Leon E. Browning, has opened an office for the practice of architecture in Lexington, Ky. For the past 11 years he has been associated with other architectural firms in the area.



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Used as a downline, Primacord simplifies multiple priming and/or deck loading techniques. Saves time and labor costs when loading. As a trunkline, it connects all holes for instantaneous or surface delay initiation. Available in standard and special types, developed to meet varying needs. For further information, consult your explosives supplier or write

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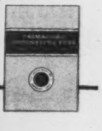

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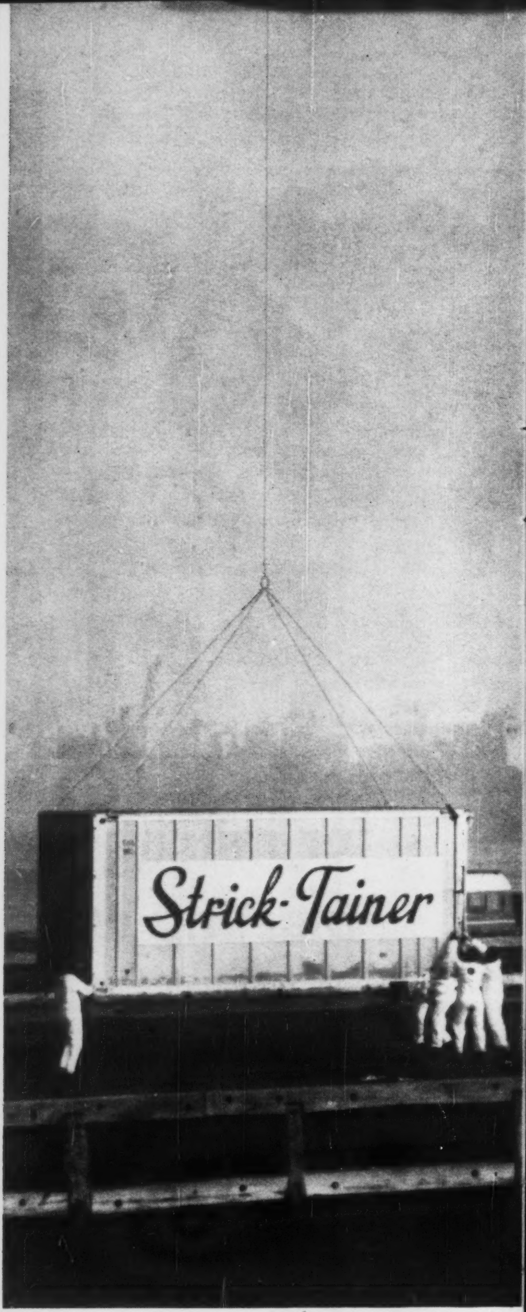
THIS IS A SIKORSKY SKYCRANE... designed to lift, carry, and set down a load suspended below. As an airborne crane, it can work at sites inaccessible to road-bound cranes—the open water, steep and rugged terrain, and dense woodland. And it does its work in far less time and with much less effort than is needed by more conventional methods.



THIS IS A STRICK-TAINER. Loaded, locked, and sealed from origin to destination, it eliminates costly multiple handling of cargo. It can be removed from a truck to a freight car and then removed again for transport to the hold of a ship. The Strick-Tainer not only reduces handling costs but nearly eliminates all loss by damage and pilferage too. It also reduces insurance premiums, and allows cargo to go through in a fraction of the time.

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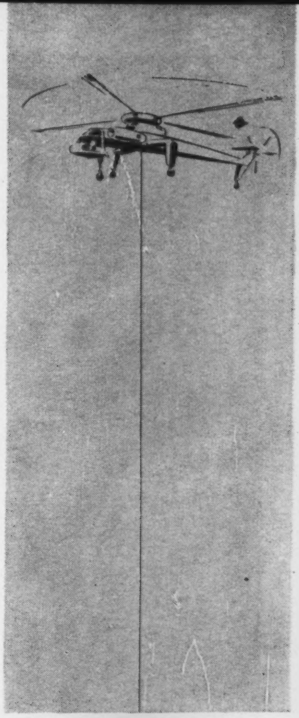

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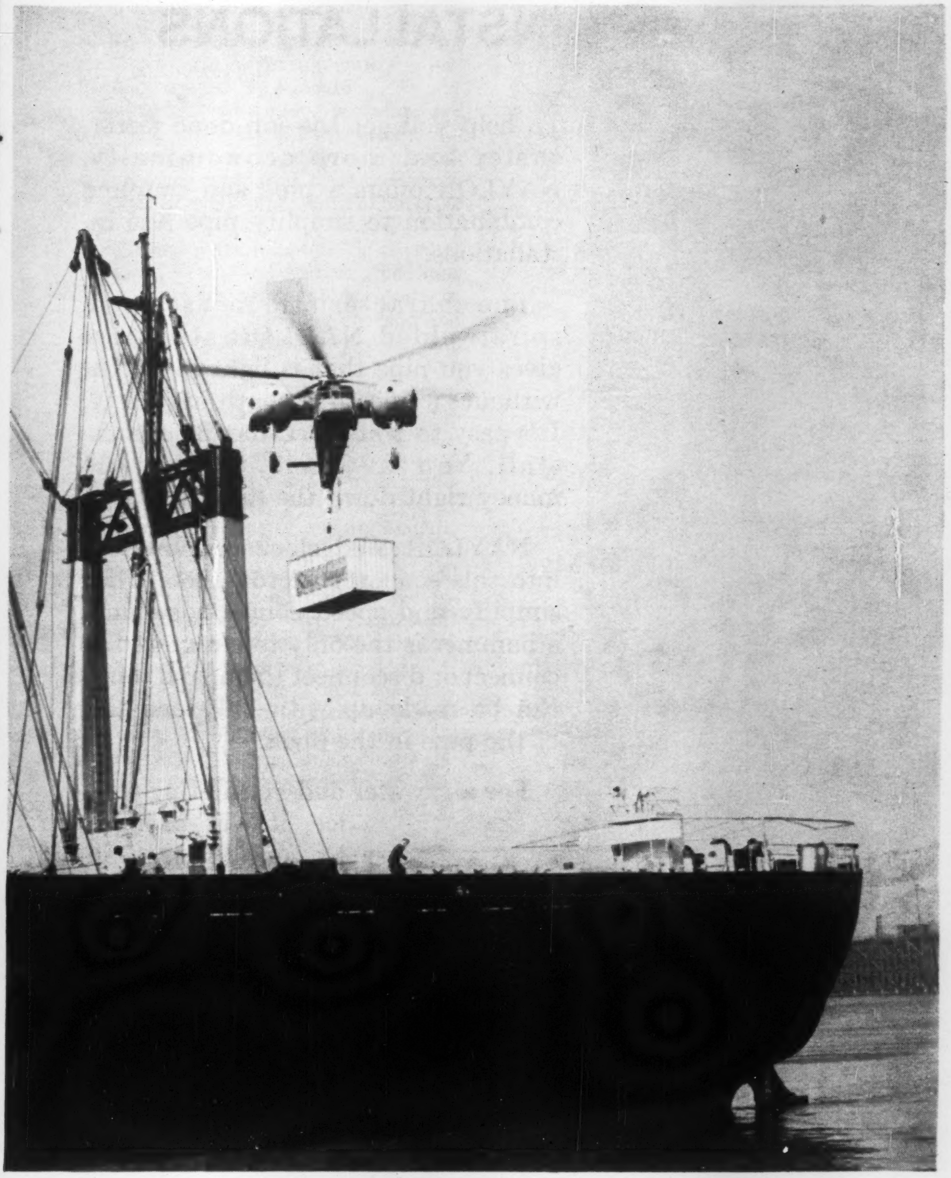
WHAT CAN THIS NEWEST SIKORSKY SKYCRANE LIFT FOR YOU? Now in production, new twin-turbine S-64's will lift and carry up to 10 tons easily as a breeze. And the load can take any shape at all: transmission towers, poles, heavy drilling or construction equipment, tools, drums, parts, vehicles, even a small bridge. The new Skycranes will also carry such detachable pods as: field offices, medical units, tool sheds, kitchens, passenger conveyances, or anything else you might need. A Sikorsky representative will be glad to give you all the details. Why not write today?



AND WHEN A SIKORSKY SKYCRANE MOVES A STRICK-TAINER from rail or truck to a waiting ship in the bay, or from ship to land, this cargo container becomes the most modern transfer system in the world. Transferring the container easily and quickly by the Skycrane eliminates expensive hoisting equipment—tugboat, docking, and labor fees. Loading time is reduced to a minimum, and productive sailing time increased substantially.

UNITED AIRCRAFT CORPORATION SIKORSKY AIRCRAFT DIVISION
Stratford, Connecticut

HOW TO SIMPLIFY PIPE LINE INSTALLATIONS

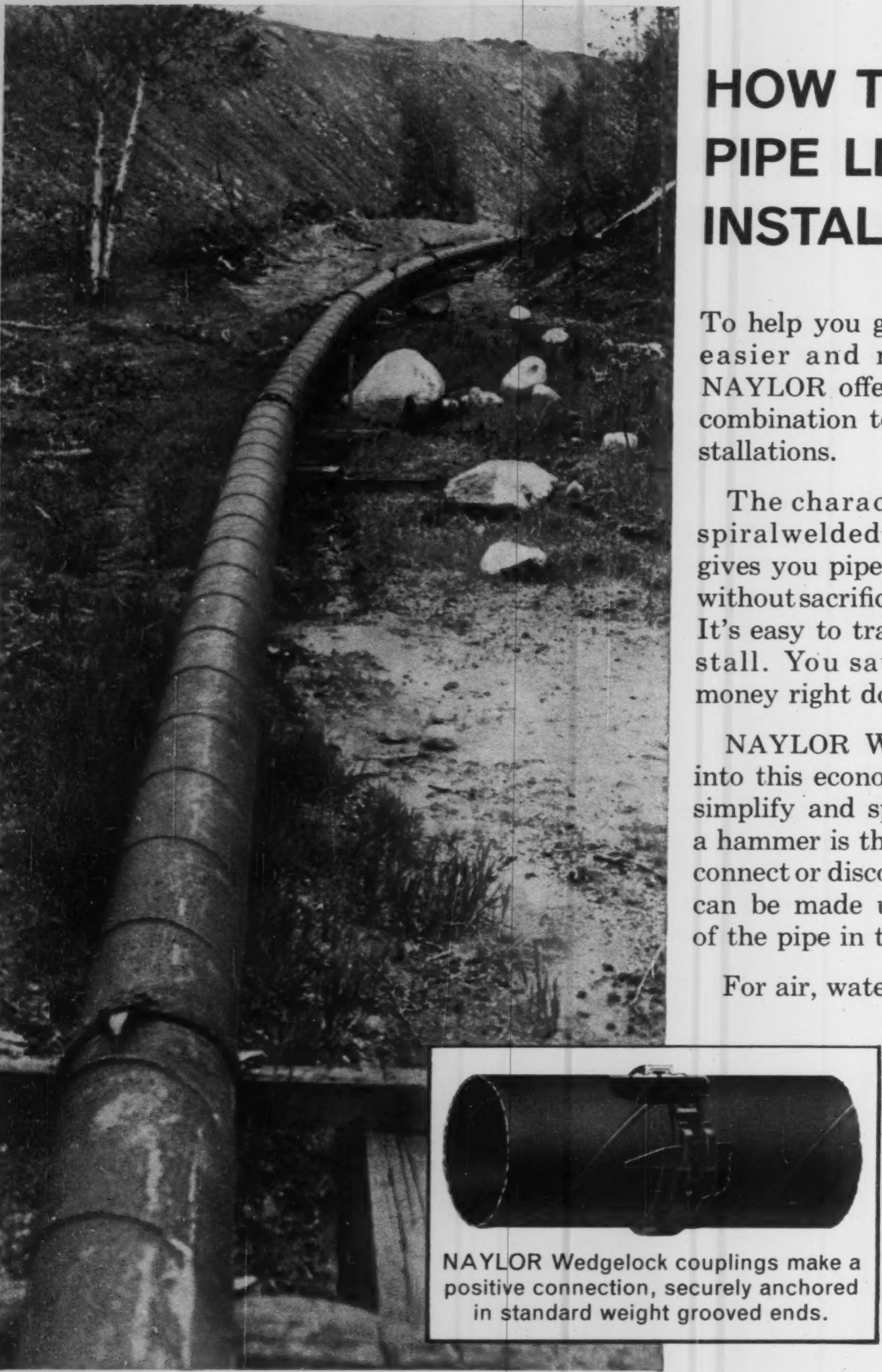
To help you get the job done faster, easier and more economically, NAYLOR offers a pipe and coupling combination to simplify pipe line installations.

The characteristic lockseamed, spiralwelded NAYLOR structure gives you pipe that is light in weight without sacrifice of strength and safety. It's easy to transport, handle and install. You save time, trouble and money right down the line.

NAYLOR Wedgelock couplings fit into this economy picture, too. They simplify and speed connections since a hammer is the only tool required to connect or disconnect them, and joints can be made up with only one side of the pipe in the open.

For air, water and ventilating service, it will pay you to consider this dependable NAYLOR pipe and coupling combination.

Write for Bulletin No. 59.



NAYLOR Wedgelock couplings make a positive connection, securely anchored in standard weight grooved ends.

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Books

Woodwork: Soup to Nuts

THE COMPLETE WOODWORKING HANDBOOK—by Jeanette T. Adams & Emanuel Stieri. 568 pages. Arco Publishing Co., Inc., New York, N. Y. $4.95

Ages ago, a man pushed over a tree and spent the night under it for protection against a rainstorm. Woodworking has come a long way since and it's still changing. This volume on the practice of woodworking doesn't tell how to push over trees but covers practically every other current facet of the trade.

Starting with complete descriptions of wood types and species, the book moves through hand and power tools, hardware, proper handling of wood and laminates to finishing, repairing and painting.

Separate chapters treat individual power tools, with emphasis on safe operation and correct maintenance. Joining and cutting methods are grouped in chapters with the power tools appropriate for the work.

Shop and job site superintendents should find the book a worthwhile reference, though great emphasis is placed on home shop setups, even to the inclusion of various "projects," from small tables to combination TV and hi-fi room dividing cabinets.

While some pictures and diagrams appear muddy and some seem borrowed, the book is profusely illustrated. A closely packed six-page index covers the entire contents with detailed cross references.

Fluid Mechanics

PRINCIPLES OF FLUID MECHANICS—by Richard A. Kenyon. 216 pages. Ronald Press Co., New York, N. Y. $7.

This book is written for a first course in fluid mechanics. The author emphasizes the basic unity of fluid mechanics and thermodynamics.

He makes a rigorous approach, stressing the importance of fundamental theory to the study of compressible and incompressible fluids. He proceeds from the general case of unsteady, compressible, three-dimensional flow to the special cases of one-dimensional, steady, incompressible and ideal flow.

Applications treated include motion of rockets and satellites, turbomachinery and jet engines.

The concept of empirical analysis is introduced for use in applying the basic theory to real fluid systems. Problems and references are given at the end of each chapter.

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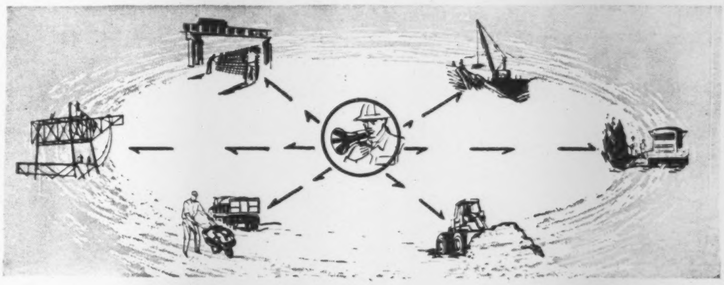

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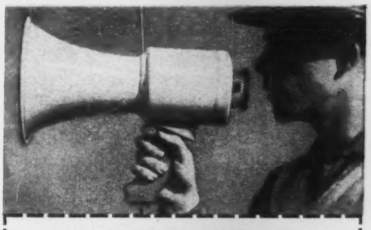

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Resources Papers

RESOURCES DEVELOPMENT: FRONTIERS FOR RESEARCH—Edited by Franklin S. Pollak. 333 pages. University of Colorado, Boulder, Colo. $3.75.

Papers presented at the 1959 Western Resources Conference are compiled in this book in an effort to expand knowledge of our nation's western resources.

Land policy and agricultural development; the problem and promise of atomic energy; water, land, and mineral use; and recreation are treated. The book is weighted heavily toward water resources covering western water law, the various Colorado River controversies, better river system planning, etc. In this comprehensive treatment the legal, the civic, the economic, and the engineering aspects of the subject material are covered.

A table of contents outlines each paper. The book is also amply indexed.

Brief Reviews . . .

SURFACE WATER TEMPERATURES AND SALINITIES — C&GS Publication 31-1, First Edition, by the Coast and Geodetic Survey, U. S. Department of Commerce. 75 pages. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 50 cents. Data are based on observations made in Atlantic harbor and coastal waters through 1958. Principal table gives monthly and annual means and extremes of surface water temperatures and salinities for each year of observation after 1953 at 120 tide stations. Supersedes Special Publication No. 278 and C&GS Publication No. 31-2.

HYDRAULICS OF BRIDGE WATERWAYS—By the Bureau of Public Roads, U. S. Department of Commerce. 53 pages. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 40 cents. First of a proposed series of bulletins on hydraulic design of highway drainage structures. Presents simplified methods for computing backwater caused by bridges, developed from extensive model tests and checked against actual measurements at bridge approaches.

HYDRAULIC RESEARCH IN THE UNITED STATES—National Bureau of Standards Miscellaneous Publication 231, edited by Helen K. Middleton. 190 pages. $1. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. This is the latest number in an annual series dating back to 1951. It reports on hydraulic and hydrologic research, done at 72 private or state laboratories in the U. S., 22 federal laboratories, and eight Canadian laboratories. Nearly 200 subjects are covered.

(*Books continued p. 167*)

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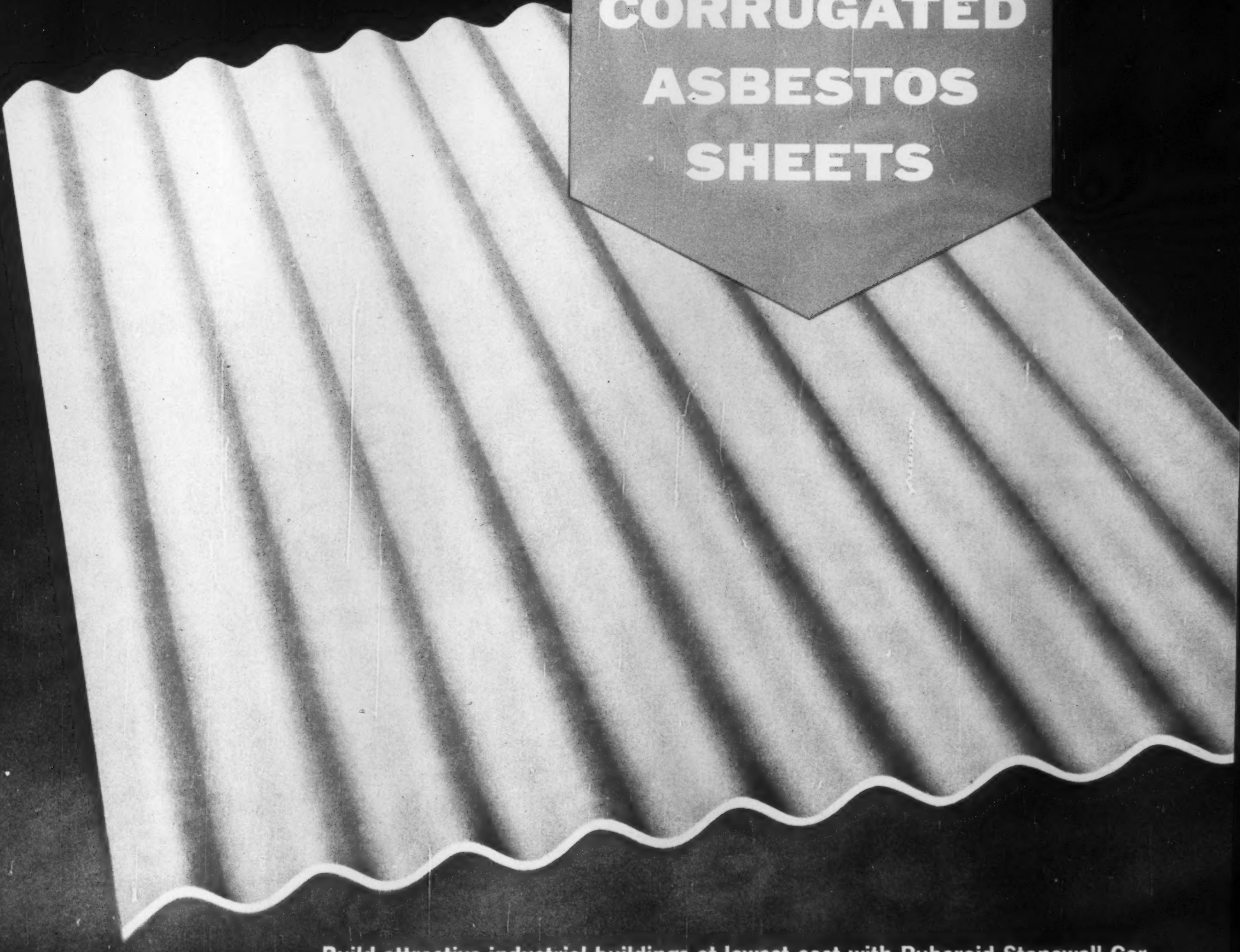

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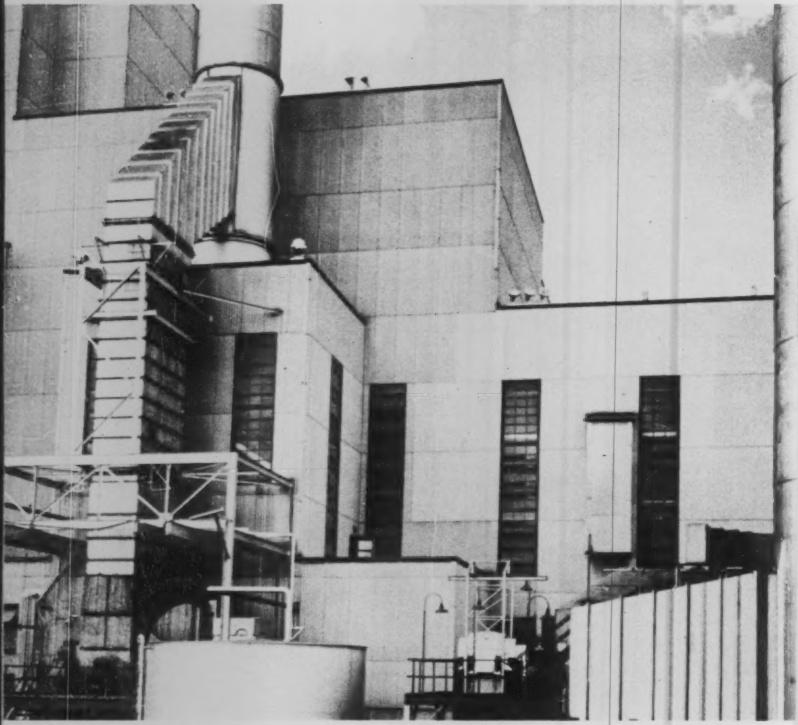
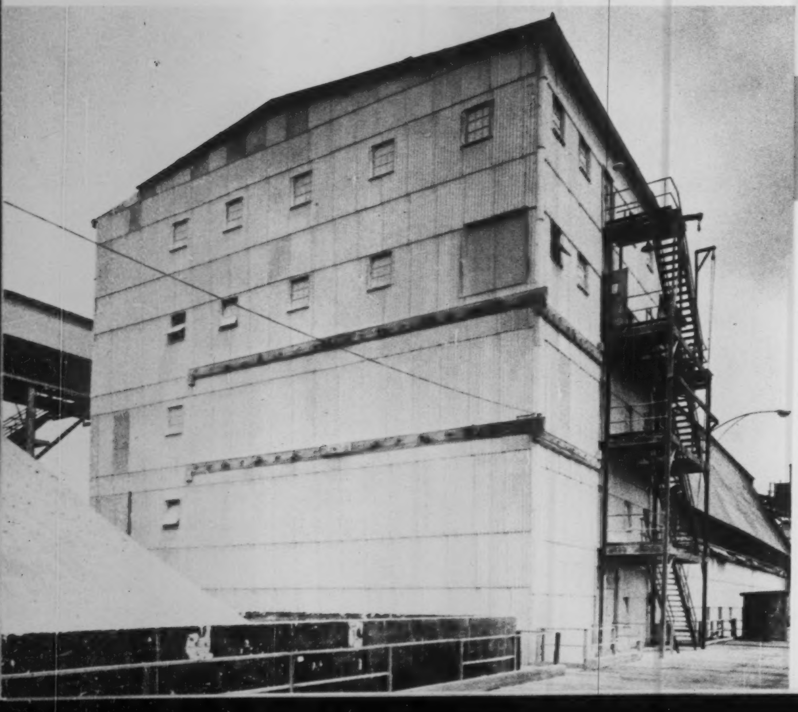


Recent unretouched photos show excellent condition of these structures—all built 12 years or more ago with low-cost Ruberoid Stonewall Corrugated Asbestos Sheets

BUILT 1948

Tampa Electric Company
Hookers Point Power Plant
Tampa, Florida

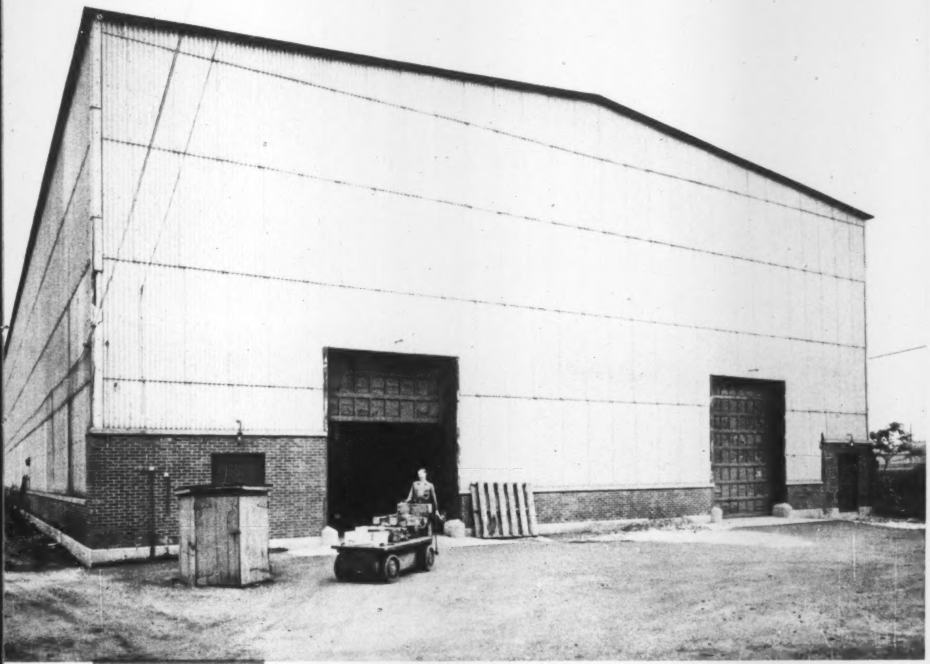
This building houses steam turbine engines. Ruberoid Stonewall Corrugated Asbestos Sheets were installed 13 years ago. Although walls have been subjected to sulphuric acid from smoke and moist air, no maintenance has been required — Ruberoid Stonewall Corrugated Sheets cannot rust or corrode.



BUILT 1946

Warners Plant
American Cyanamid Company
Industrial Chemicals Division
Warners, New Jersey

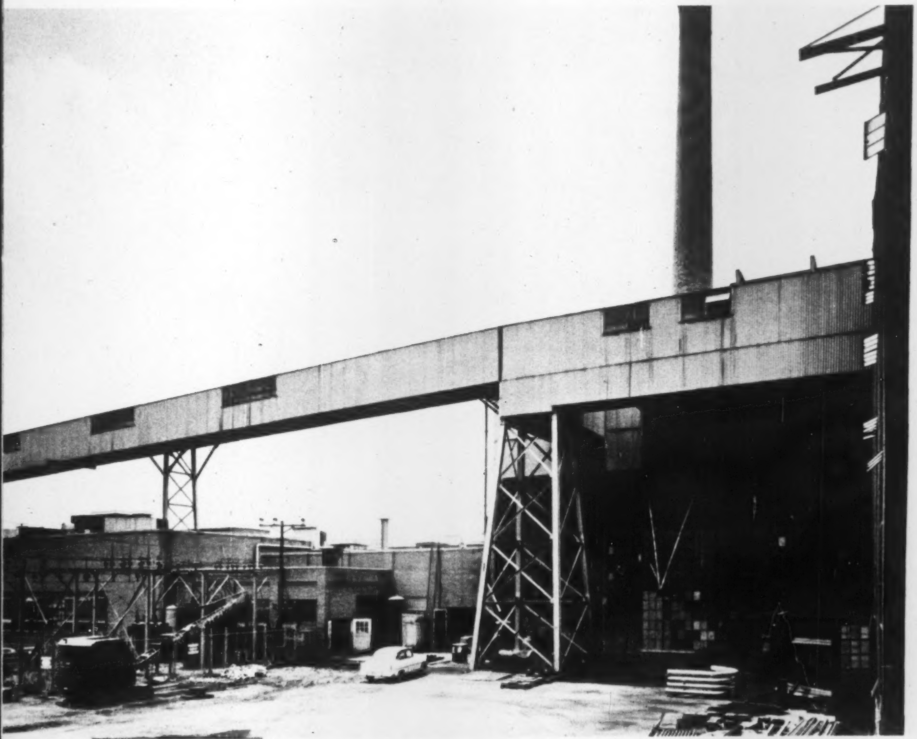
At this plant, Ruberoid Stonewall Corrugated Asbestos Sheets have stood up to severe chemical exposure for 15 years. You can rely on this siding and roofing material for top durability—even under the most extreme corrosion conditions. Ruberoid Research Laboratories will be glad to provide opinions based on the information you give them about *your* special cases of chemical exposure.



BUILT 1944

Worthington Corp. Pattern Storage Bldg., Harrison, New Jersey

For 17 years, Ruberoid Stonewall Corrugated Asbestos Sheets have provided all-weather protection for wood patterns used in making molds in Worthington's foundry. Such lifetime weather protection is typical of this economical material.



BUILT 1947

Riegel Paper Corporation, Frenchtown, New Jersey

For 14 years, Ruberoid Stonewall Corrugated Asbestos Sheets have provided fireproof housing for this coal conveyor. Stonewall Corrugated Asbestos Sheets are ideal for applications where fire is a distinct hazard.

LOW COST CONSTRUCTION!

Ruberoid Stonewall Corrugated Asbestos Sheets eliminate sheathing expense because they can be applied directly to framing. They permit the use of lightweight supporting members of steel or timber. . . allowing lighter foundations and footings for even greater economy.

FAST, EASY APPLICATION!

Stonewall Corrugated Asbestos Sheets are factory-cut to fit the exact length of the supporting structure. Field cutting is limited to trimming sheets at rakes, gable ends and around projections. This material is easily handled, cut and drilled. (No special erection tools are needed.)

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Stonewall Corrugated Asbestos Sheets are made of Portland cement reinforced with tough asbestos fibres. They provide permanent, rock-life roofing and siding for practically *any type* of building in *any climate*.

FIREPROOF!

The Underwriters' Laboratories in its research Bulletin No. 32, designates asbestos-cement as 0 combustibility, 0 flame spread, and 0 smoke production. Nothing can be more fire-safe than that, and no material can have a lower rating.

NON-CORRODIBLE!

Stonewall Corrugated Asbestos Sheets resist acids, alkalis, smoke and chemical fumes of many types.

WEATHERPROOF!

Stonewall Corrugated Asbestos Sheets withstand heavy rains, rapid change in temperature, humid atmosphere, salt air —indefinitely. Never need paint to protect them from the weather.

SANITARY!

Ruberoid Stonewall Corrugated Asbestos Sheets are rodent and termite proof.

FEDERAL & A.S.T.M. REQUIREMENTS

Ruberoid Corrugated Asbestos Sheets meet Federal Specifications for: Roofing and Siding, Corrugated Asbestos-Cement, No. SS-B-750 and A.S.T.M. Specifications for: Asbestos-Cement Corrugated Sheets—Designation C: 221-55.

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  & Refining Co.
American Steel & Wire Co.
American Viscose Corp.
Atlantic & Pacific Tea Co.
Atlas Powder Co.
Baker Chemical Co.
Bethlehem Steel Co.
Braddock Light & Power Co., Inc.
Bridgeport Brass Co.
C. B. & Q. Railroad
Chesapeake-Camp Corp.
City of Joplin, Memorial Hall
Dravo Corp., Engineering
  Works Division
E.I. du Pont de Nemours & Co.
Ford Motor Co.
Foster Wheeler Corp.
General Electric Co.
General Motors Co.
Gillmore-Carmichael-Olsen Co.
Goodyear Aircraft Corp.
Goodyear Tire & Rubber Co.
Gulf Oil Corp.
Hamilton Standard Propeller Co.
Hercules Powder Co.
Interchemical Corp.
Kansas Soya Products Co.
Lever Bros. Co.
Lord & Burnham
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Marquette Cement Mfg. Co.
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Socony Vacuum Oil Co.
Southern R.R. Co.
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Standard Oil Co. of N. J.
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  Shipbuilding Yard
Stone & Webster
  Engineering Corp.
Sun Shipbuilding & Drydock
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Roads and Their Traffic—by Ernest Davies 352 pages. Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y. $12.00.

Encyclopedia of Spectroscopy — by George L Clark. 787 pages. Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. $25.00.

Taxes for the Schools—by Rogert A. Freeman. 441 pages. The Institute for Social Science Research, Continental Building, Washington 5, D. C. $5.00.

Southern Standard Building Code—Southern Building Code Congress, Brown-Marx Bldg., Birmingham, Ala. $6.50.

Guide to Design Criteria for Metal Compression Members—Column Research Council Engineering Foundation (Robert B. Harris, Secretary), 319 W. Engineering, University of Michigan, Ann Arbor, Mich. $5.00.

Principles of Fluid Mechanics—by Richard A. Kenyon. 216 pages. Ronald Press Co., 15 East 26th St., New York 10, N. Y. $7.00.

Elements of Photogrammetry—by Wilfred H. Baker. 199 pages. Ronald Press Co., 15 East 26th St., New York 10, N. Y. $5.00.

Transistors: Principles, Design, and Applications—by Wolfgang W. Gartner. 675 pages. D. Van Nostrand Company, Inc., 120 Alexander St., Princeton, N. J. $12.50.

Stresses in Shells—by Wilhelm Flugge. 499 pages. Walter J. Johnson, Inc., 111 Fifth Ave., New York 3, N. Y.; Stechert-Hafner, Inc., 31 East 10th St., New York 3, N. Y. $14.10.

The Complete Woodworking Handbook—by Jeannette T. Adams and Emanuele Stieri. 568 pages. Arco Publishing Co., Inc., 480 Lexington Ave., New York 17, N. Y. $4.95.

It's the Law!—by Bernard Tomson. 436 pages. Channel Press, 159 Northern Blvd., Great Neck, N. Y. $7.50.

Building with Steel—by Don A. Halperin. 255 pages. American Technical Society, 848 East 58th St., Chicago 37, Ill. $6.00.

Proceedings of the 1959 Technical Sessions of the International Commission on Illumination—Four volumes. Volume A: Sources of Radiation; Volume B: Lighting Technology; Volume C: Lighting Applications; Volume D: Lighting for Transport. T. D. Wakefield, The Wakefield Co., Vermilion, Ohio. $20.00 for four volumes.

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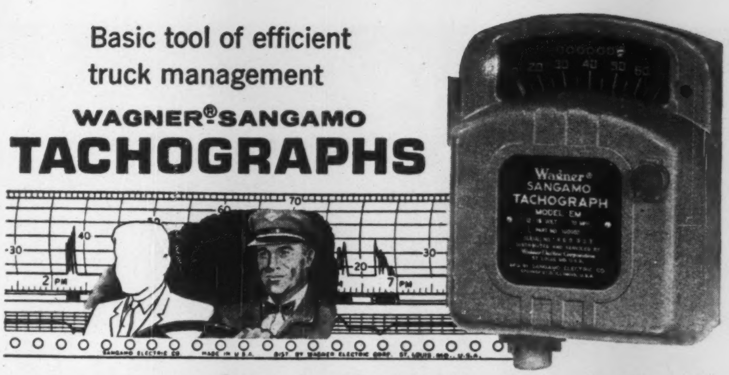

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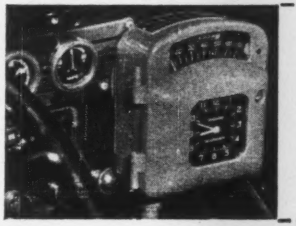

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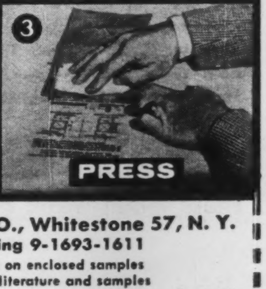

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Compilation of ASTM Standards on Bituminous Materials for Highway Construction, Waterproofing and Roofing—American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $5.50.

ASTM Standards on Mineral Aggregates and Concrete—American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $5.75.

Symposium on Road and Paving Materials—STP 277. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $3.50.

1959 Supplement to the Bibliography and Abstracts on Electrical Contacts—STP 56-N. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $3.50.

Highway Transportation Criteria in Zoning Law and Police Power and Planning Controls for Arterial Streets—Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 35¢.

Federal Laws, Regulations, and Other Material Relating to Highways—Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. $1.00.

Soil Compaction and Proof-Rolling of Subgrades—Bulletin 254. Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. $1.00.

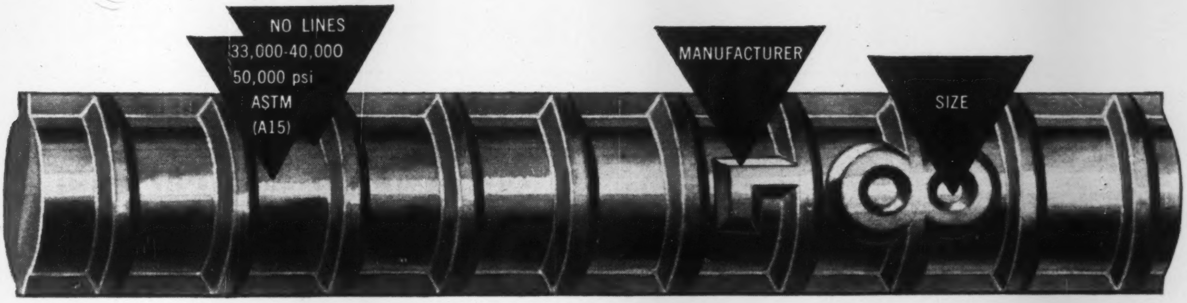
Cleaning and Purification of Air in Buildings—Publication 797. Building Research Institute, 2101 Constitution Ave., N.W., Washington 25, D. C. $4.00.

Housing Codes—Three volumes. Volume 1: Background of Code Enforcement; Volume 2: Model Housing Code; Volume 3: Administrative Guide. State Division of Housing, 270 Broadway, New York 7, N. Y.

National Goals in Air Pollution Research—Department of Health, Education and Welfare, Public Health Services, Washington 25, D. C.

Survey of the Law of Building Codes—by Charles S. Rhyne. National Association of Home Builders, 1625 L St., N.W., Washington 6, D.C. $2.00.

Urban Research 1960—Bulletin 256. Highway Research Board, 2101 Constitution Ave., N.W., Washington 25, D. C. 80¢.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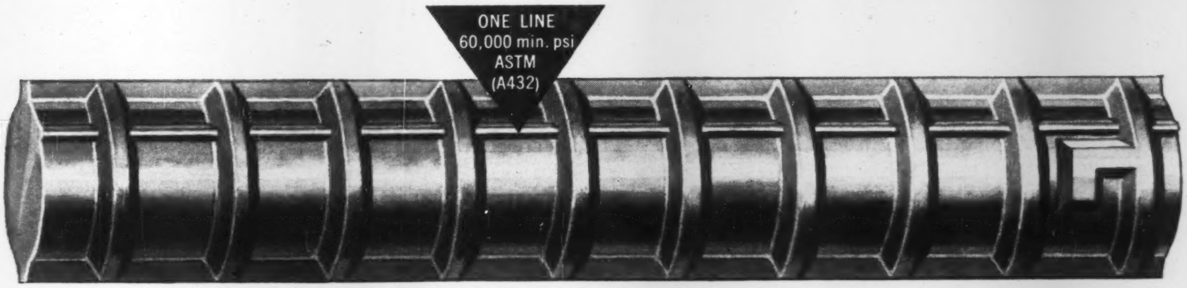
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(A432)

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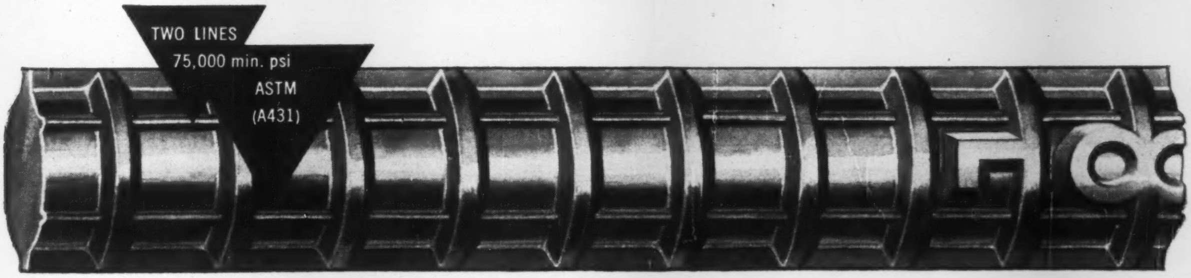
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Truck cranes

Technical portfolio, 22 pages in color, includes 22 capacity charts, 7 general dimension drawings, a crane range diagram for the P&H Model 255B-TC truck crane. Harnischfeger Corp. **307**

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Twelve pages of tables and charts showing crane capacities of Series 350 Schield Bantam crane excavators on wheels, with and without outriggers, and on tracks. Also specifications. Schield Bantam. **308**

Crawler excavator

General dimensions, specifications, working ranges and capacities for Insley WT with backhoe, crane clamshell, dragline and shovel attachments. 12 pages in color. Insley Mfg. Co. **309**

Scraper

Loading, hauling and dumping characteristics of the "Euc" TS-14, a 14-cu-yd struck, 20-cu-yd heaped scraper. Includes photographs of components. 20 pages. Euclid Division of GM. **310**

Tractor scraper

Specifications, loading cycles and servicing details for the Caterpillar 619B wheel tractor and the 14-cu-yd (struck) 442 low-bowl scraper. 12 pages in color. Caterpillar Tractor Co. **311**

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Construction and operating details of the "Euc" C-6 crawler tractor. Includes specifications and pictures of components. 24 pages. Euclid Division of GM. **312**

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Uses of H-3 (gasoline) and HD-3 (diesel) crawler tractors. General specifications and attachments. Eight pages. Allis Chalmers Mfg. Co. **313**

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Explains how Koehring TriBatch pavers give up to 43% more paving production. Four pages; color. Koehring. **314**

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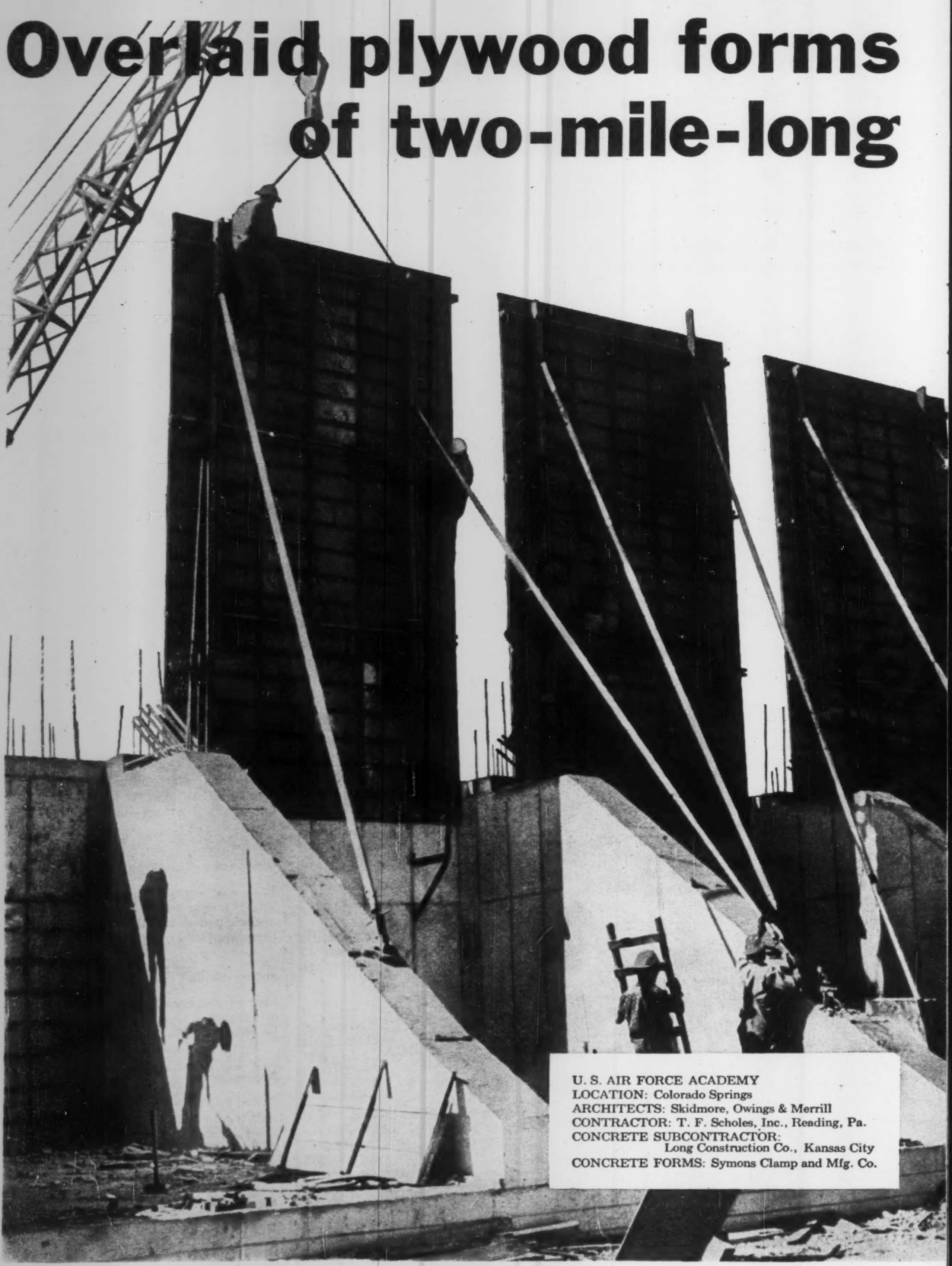
Overlaid plywood forms of two-mile-long



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CONTRACTOR: T. F. Scholes, Inc., Reading, Pa.
CONCRETE SUBCONTRACTOR:
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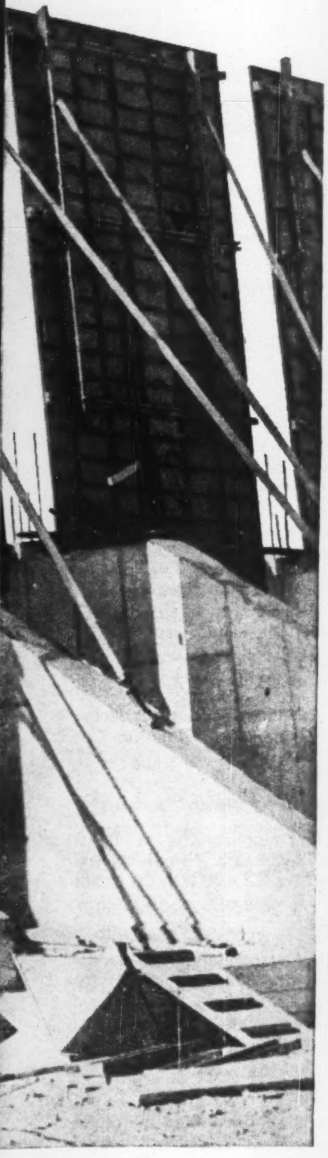

Overlaid plywood concrete forms did a big job in a hurry at the Air Force Academy in Colorado Springs. The 10,000 ft. retaining wall that bounds two sides of the raised campus was formed at the rate of 70 lin. ft. daily. Large plywood panel assemblies cut time and cost because of their high rate of re-use. And the overlaid plywood formed such smooth concrete that it was possible to install granite surfacing over it with a minimum clearance and maximum simplicity of anchorage.

Wall height varies from 15½ to 33 ft. Along most of its length, counterforts on 14-ft. centers connect it with an anchor wall 18 ft. to the rear. Each 70-ft.-long section was concreted in three pours: first, footings; second, anchor wall and the lower 13 ft. of both counterforts and main wall; third, upper portions.

Form components were Symons Steel-Ply forms—2x8-ft. panels of high density overlaid fir plywood, encased in steel frames 2½ in. thick. They were pre-assembled into large units, two panels high and six wide, and placed by crane or from traveling scaffolds. Overlaid plywood was specified to produce ultra-smooth concrete and for its high re-usability. The contractor formed 600,000 sq. ft. of wall with 37,000 sq. ft. of plywood and has used the same forms many times since.

ALWAYS SPECIFY DFPA-QUALITY TRADEMARKED PLYWOOD. Concrete form grades include: INTERIOR PLYFORM®—standard concrete form grade, made with moisture-resistant glue, gives multiple (up to 12) re-uses; EXTERIOR PLYFORM®—standard concrete form grade, made with waterproof glue, gives up to 25 or more re-uses; OVERLAID EXTERIOR PLYWOOD—special panel with hard, glossy resin-fiber surfaces—forms smoothest concrete, gives up to 200 re-uses.

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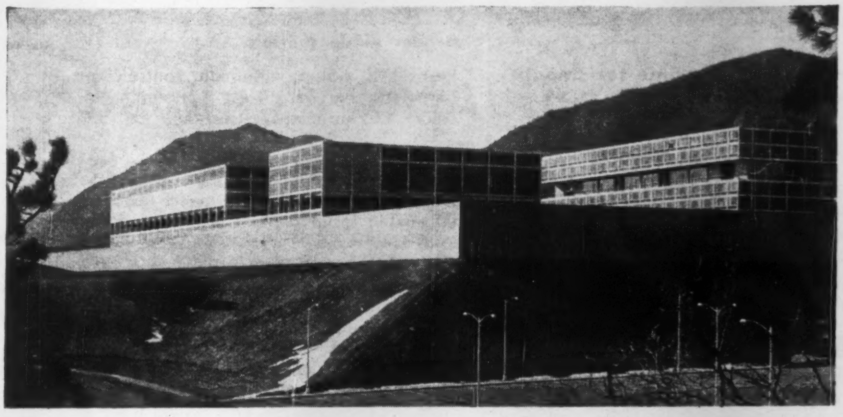

In design and material, the granite-surfaced concrete wall is architecturally harmonious with the raised geometric campus it encompasses. Overlaid plywood forms insured smooth concrete and reduced costs.

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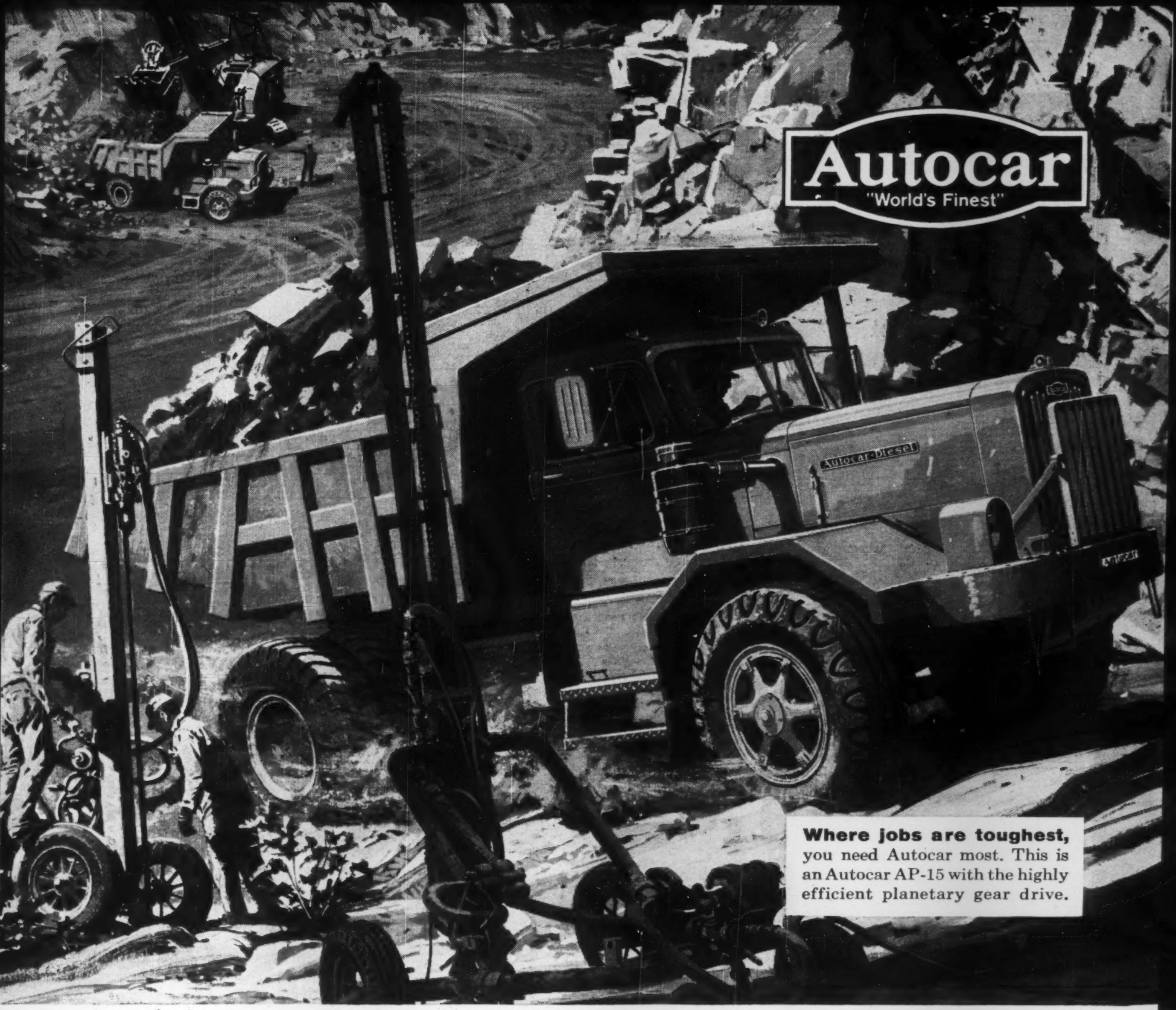

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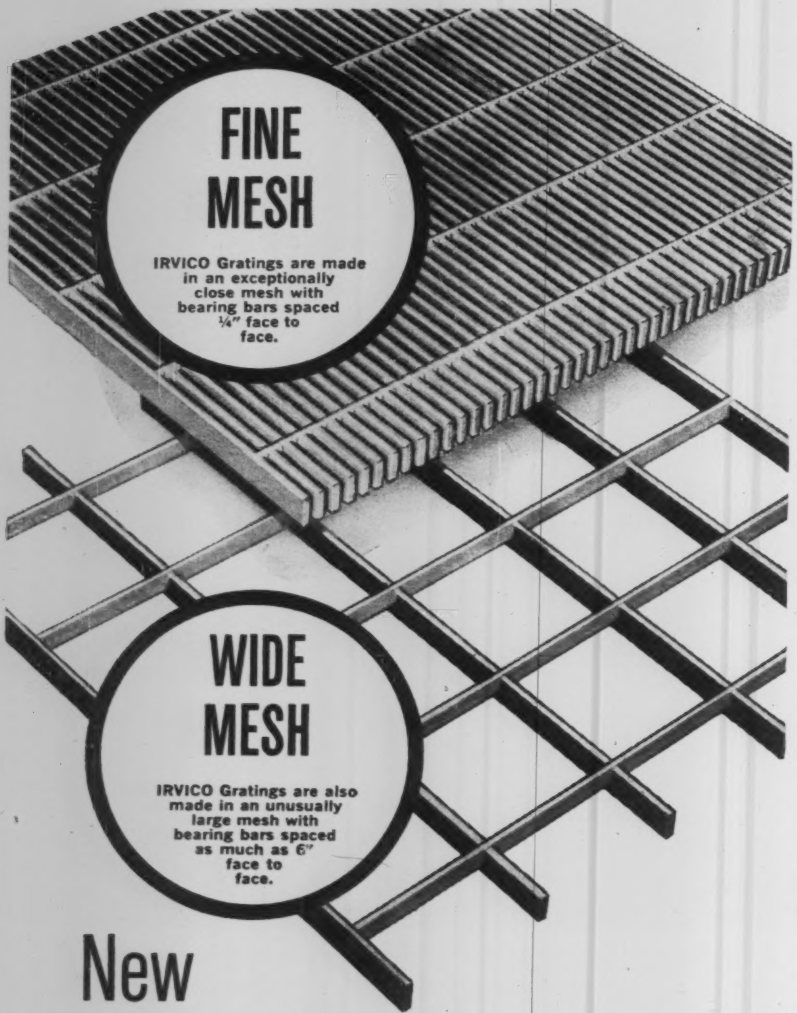
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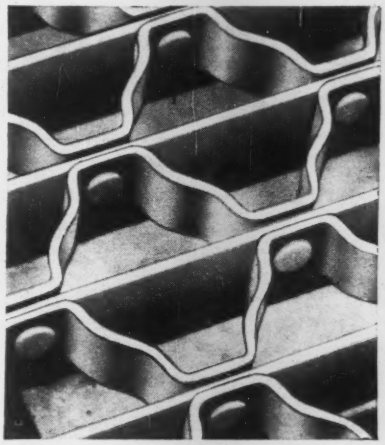

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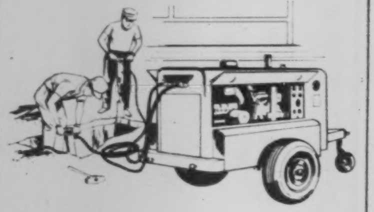

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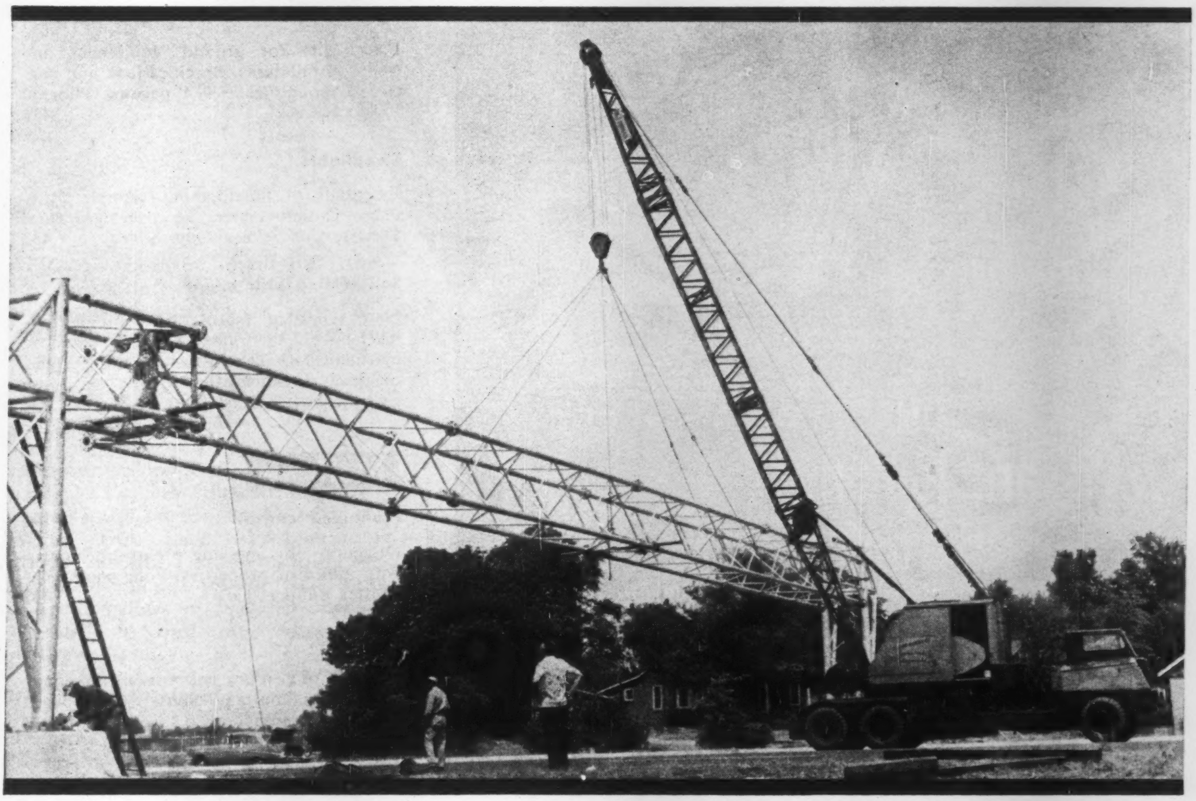

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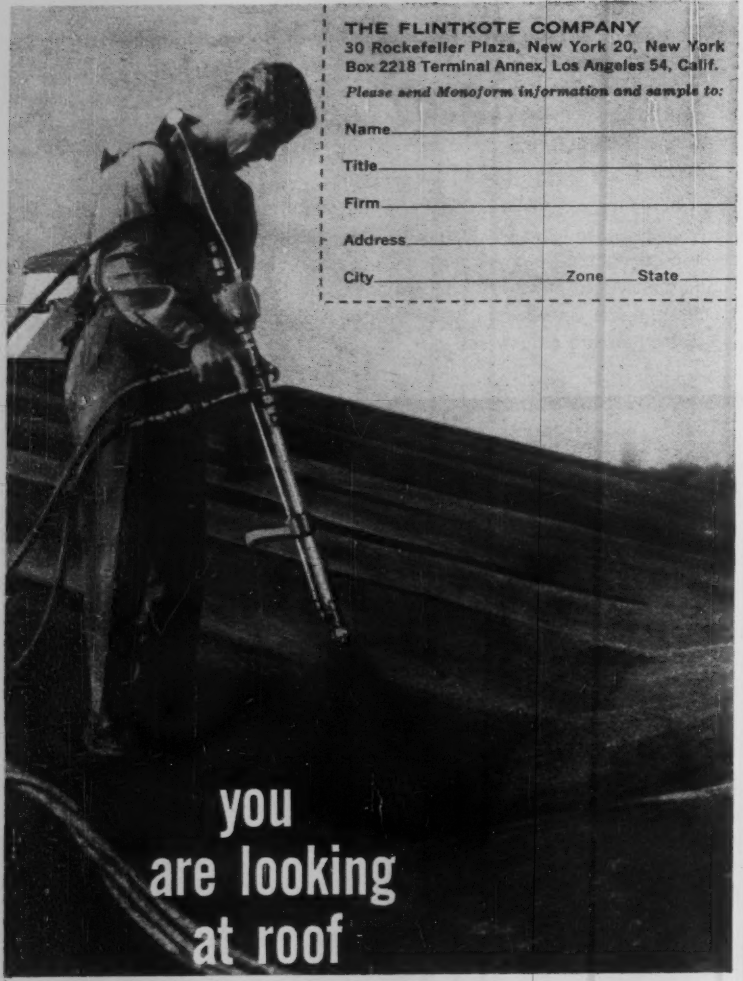

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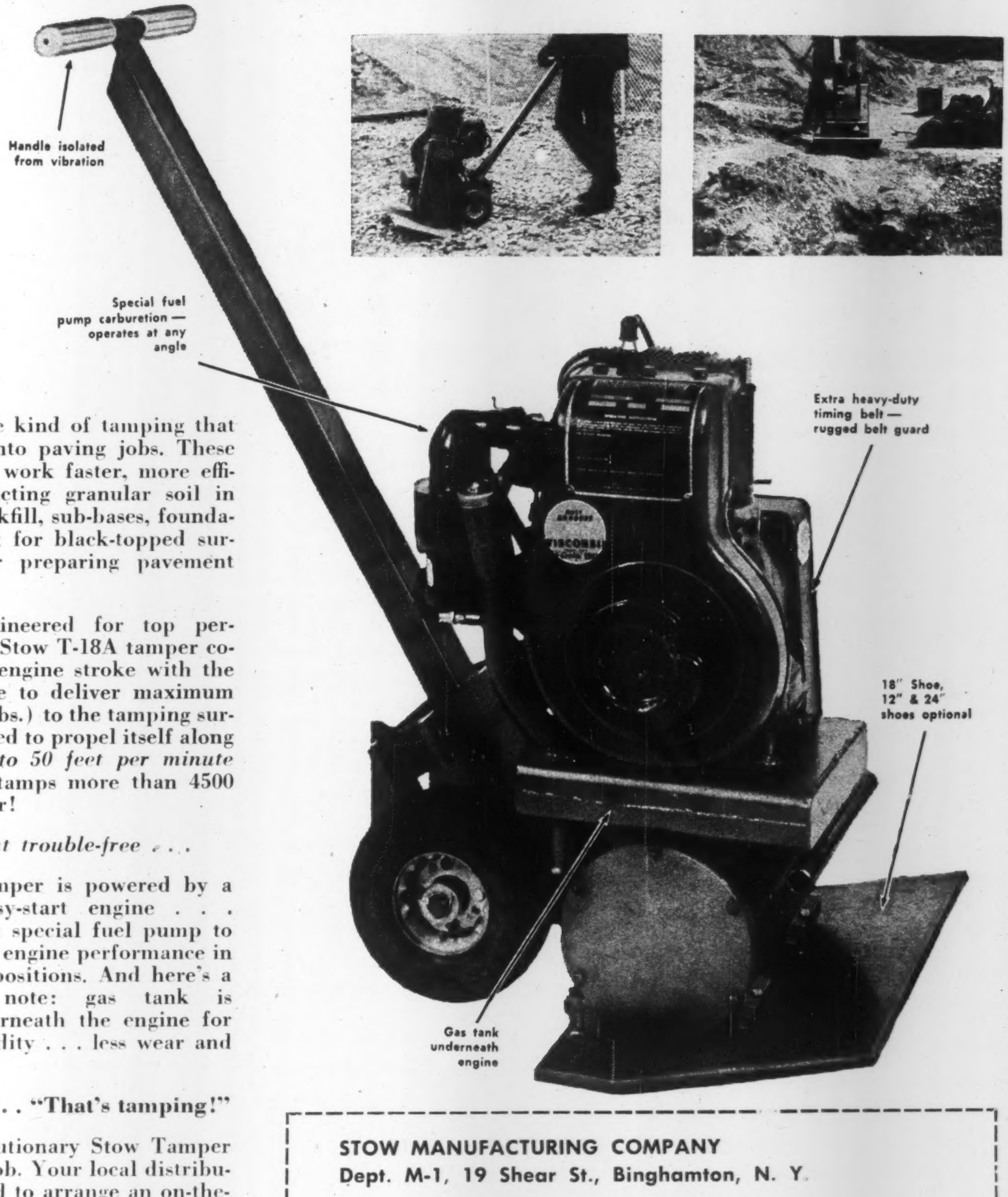
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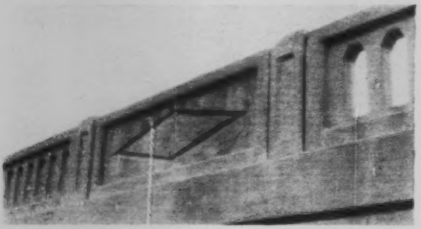

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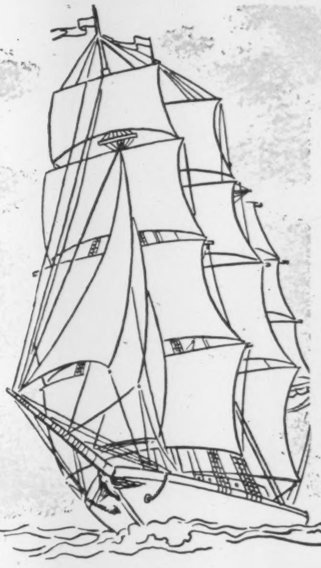

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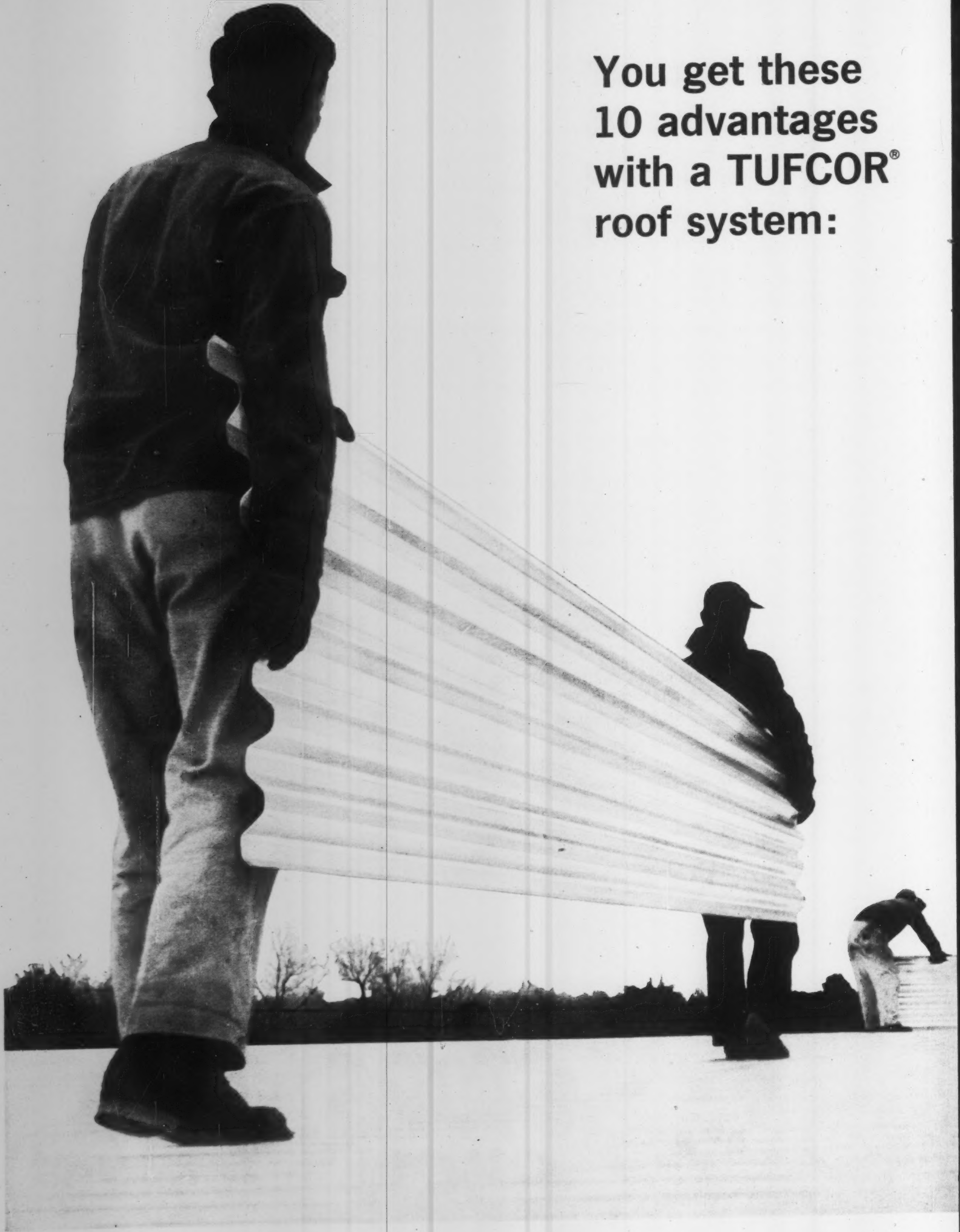

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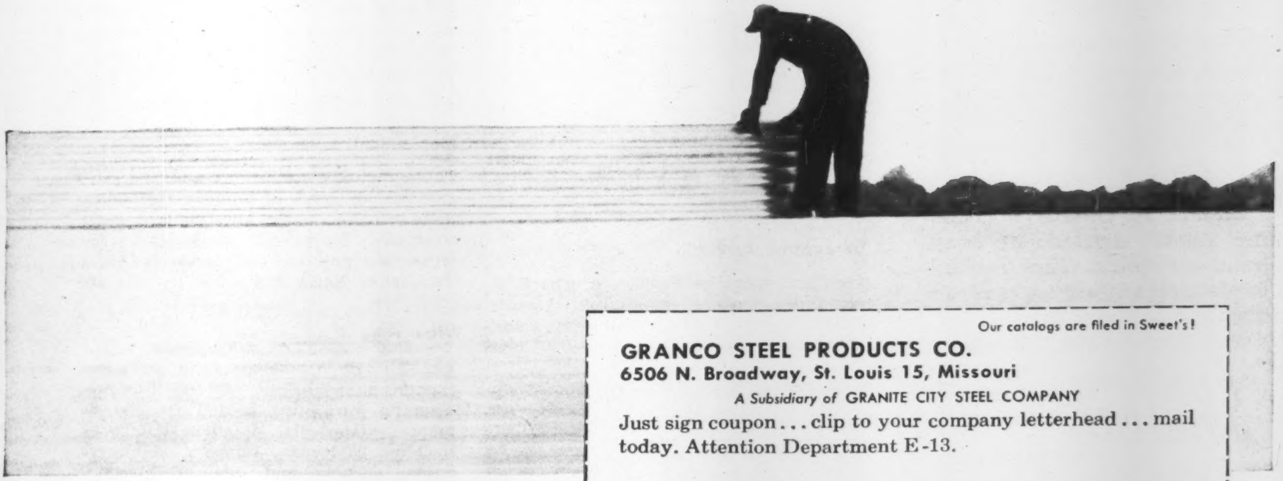

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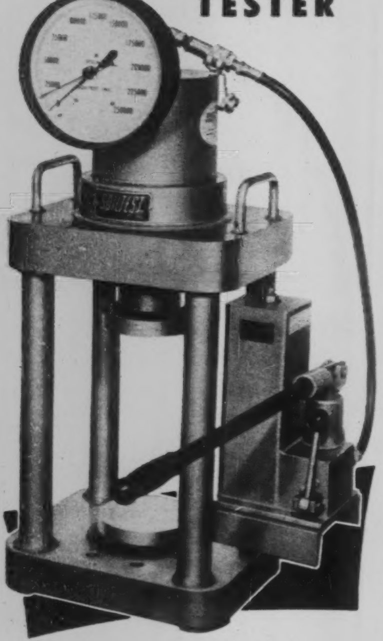

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Dredge

How Dayton, Ohio, profits from owning a hydraulic dredge with an 8-in pipeline. Four-page illustrated brochure. Ellicott Machine Corp. **451**

Two-way radio guide

A 16 page, non-technical businessman's guide to two way radio. Gives important FCC licensing requirements. General Inc. **453**

Welding alloys

Wall chart, 19½ x 25½ in., shows welding, brazing and soldering alloys and fluxes according to the base metal or metals to be joined. All-State Welding Alloys Co., Inc. **454**

Welding

Arc welding stainless steel. Instructions and tables of welding characteristics. 12 pages. Lincoln Electric Co. **454**

Nuclear soil testing

Determination of moisture and density of soil, aggregates, concrete and asphalt is explained in a six-page brochure. Nuclear-Chicago Corp. **455**

Roofing

Specifications for constructing a built-up watertight roof and for reroofing, insulation and flashing. 28 pages. Koppers Co., Inc. **456**

Metal lath and plaster ceilings

Data for designing a metal lath and plaster suspended ceiling are presented in a two-page pamphlet. Metal Lath Manufacturers Association. **457**

Building entrance maintenance

Cleaning, restoration and preservation of materials used in building entrances. Section drawings. 22 pages. International Steel Co. **458**

Miscellaneous

Vacuum street cleaner

Six page folder on the Vac-All, tank truck mounted street cleaner that vacuums leaves, bottles, cans and heavy debris from streets and catch basins. Central Engineering Co. **459**

Detonating fuse

Uses and nature of Primacord. Charts, illustrations of typical applications. 72 pages. The Ensign Bickford Co., Simsbury, Conn. **460**

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Solar ephemeris

For surveyors, engineers, instructors and students. Tables and charts of the assigned positions of the Sun, Polaris and 28 other stars for 1961. 92 pages. Gurley Engineering Instruments. **461**

Steam tube failures

A description of the physico-chemical factors contributing to tube failures in high-pressure steam generators. Prevention methods. Eight pages. Dow Industrial Service. **462**

Filing system

Details, illustrations and specifications of interlocking tubes for storing blueprints and other documents. Six pages. Pack Mfg. Co. **463**

Computer format recorder

Digital recording unit. Explanation of working principles and dimensional and performance data. Eight pages. Epsco, Inc. **464**

Welding torches

Hand welding and cutting torches with interchangeable heads. Design and operating data. Eight pages. Linde Co. Div. of Union Carbide Corp. **465**

Surveying instruments

Line of levels, level transits and tripods pictured and catalogued with specifications and costs. Six pages. David White Instruments. **466**

Lubrication rigs

Portable lubrication rigs for truck or trailer mounting. Specifications, dimensions, and components listed Eight pages. Cypher Co. **467**

Hydraulic jacks

Photographs, specifications and details on the full line of Simplex hydraulic jacks including standard, center-hole, foot-lift, push-pull service and bumper models operated manually, by gasoline, electric or air motors. 12 pages. Templeton, Kenly & Co. **468**

Mechanical jacks

Photographs, specifications and suggested uses for all types of Simplex mechanical jacks including ratchet lowering lever jacks, track jacks, journal and bridge jacks, screw jacks, and push-and-pull jacks. 16 pages. Templeton, Kenly & Co. **469**

Wire rope

The Correct Wire Rope for Contractors' Equipment (eight-page folder) lists and diagrams wire rope needed for shovels, cranes, clamshells, draglines, backhoes, slackline cableways, scrapers, bulldozers, hoists, derricks and other construction equipment. MacWhyte. **470**

How You Can Get More Information

Here's the easy way to get copies of manufacturers' publications, editorial reprints and more information about products and services advertised in ENR.

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You can order free reprints of the ENR articles below. It's a good chance to catch up on what you missed, get a file copy, or pass one along to an associate. Just circle the numbers on the inquiry card that correspond to the articles you want. Single copies are free as long as they last. Write for quantity prices.

501. Outlook for '61—A forecast of another record year for construction volume, with public works leading the way.

502. Rochester Rebuilds Downtown—The third in ENR's series of staff reports on "Fitting Cities to the Future."

503. **How to Figure Steel Weight in Bridges**—A chart gives minimum weight in highway bridges, an aid to estimating dead loads and costs.

504. **'Design and Construct' Spans the St. Lawrence**—The European contracting system brings a notable prestressed concrete bridge to the American continent.

505. **Sewage Lagoons Prove Out**—A small community near Pittsburgh has over two years experience with this economical treatment method, and likes it.

506. **Techniques and Trends in Buildings, Transportation and Water Resources**—Here's a roundup of what happened of significance in '60, and what to look for in '61.

507. **Pier 40: Versatility in Prestressed Concrete**—One of New York City's largest prestressed concrete structures, this pier called for a major precasting effort.

508. **Rugged Railroad Building**—In the Quebec bush country, construction crews have pushed 193 miles of railroad from the North Shore of the St. Lawrence.

509. **New Tool For Job Management**—A Report on the "Critical Path Method" for planning, estimating scheduling and control of engineering or construction projects.

510. **New Plants for New Products**—A 27-page special report of future trends in industrial design and construction.

511. **College Construction Booms**—A 23-page special report on a billion-dollar-a-year market for builders.

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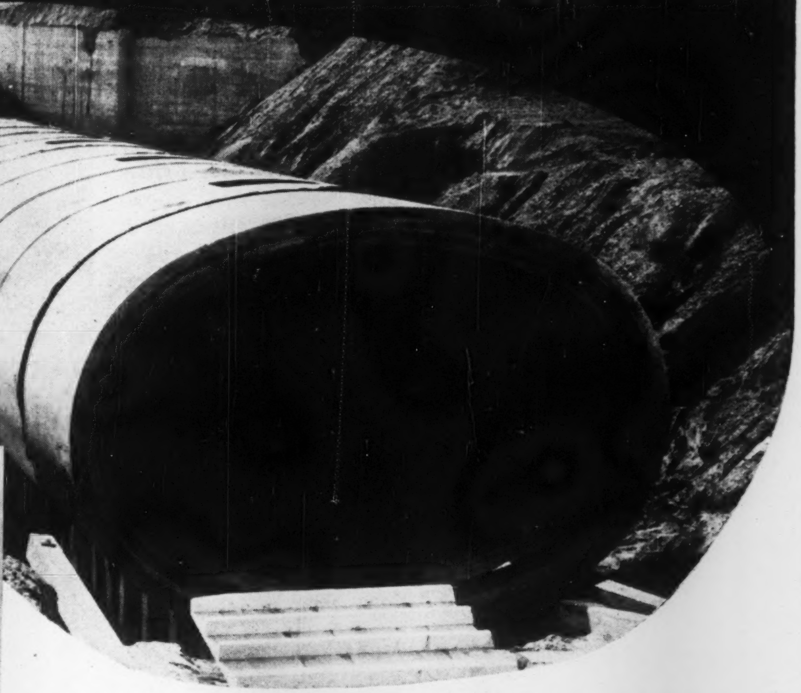
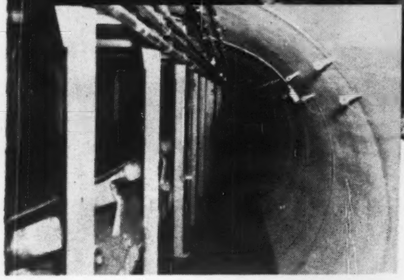
UTILITY TUNNELS with VERSATILITY

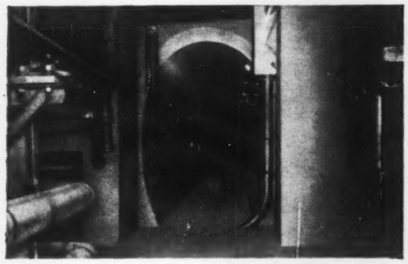


132″ Lo-Hed® conveyor tunnel being installed for Michigan Limestone Division of United States Steel Corporation at Rogers City.



On completion of Lo-Hed® tunnel at right, 48″ aggregate conveyor system is installed.

91 in. x 91 in. Flat Base utility tunnel for New Jersey firm. Note smooth, watertight joints.



Hi-Hed® makes an ideal utility gallery—assures ample head-room in passage way.

A-M PRECAST CONCRETE UNITS CUT INSTALLATION TIME AND COSTS

American-Marietta reinforced precast concrete pipe is available in a variety of shapes. This permits extreme versatility in the design of utility tunnels for carrying steam pipes, gas mains, electrical cables and telephone lines with enough room for workmen to make repairs. In addition to conventional round pipe, A-M offers LO-HED® with greater width under minimum cover; FLAT-BASE with "built-in" walk way; and HI-HED® for minimum vertical load and maximum lateral support under high fills. Find out how much installation time and money A-M Engineers can save on *your* job with *precast* pipe. Write today for information and literature.

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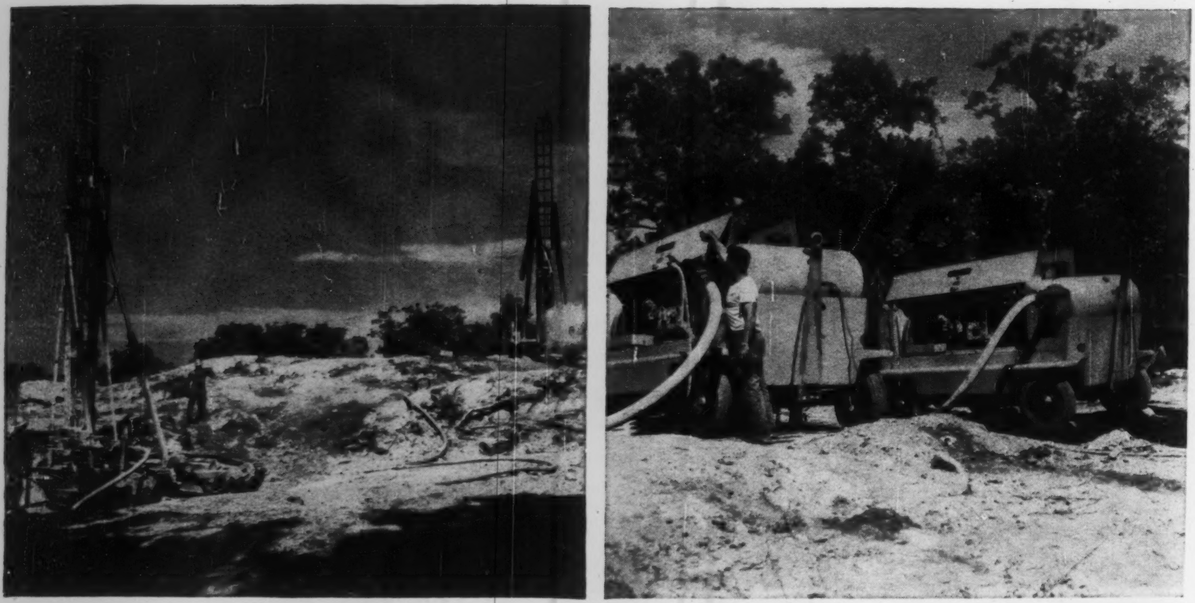
CIRCLE 193 ON READER SERVICE CARD

There's a JOY Compressor and Rock Drill Team



Heavyweight TDH Trac Drills mounting TM-550 drills (5½" bore) work on a large road job near Stoneham, Massachusetts. The big drills are powered by this pair of Joy RP-900 compressors. Nearly a million yards of rock are being drilled and moved on this project.

Logger in Washington carves mountain road with power take-off RT-600 portable and Joy drill-jib mounted on tractor.

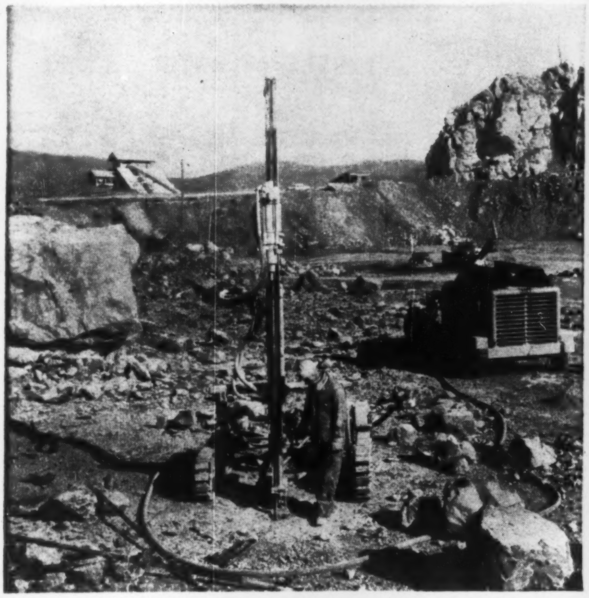
No matter where your equipment has to operate, or the size of your project, there's a Joy team that is just right for your job.

Joy's line of five types of Trac Drills gives you versatility that is unmatched. From the lightweight TDL to the super heavyweight TDH, they can provide the exact drilling power you need. The medium weight TDM Trac Drill can be equipped with U-bar drill mounting or power operated boom. Match one of these carriers with one of Joy's eight large percussion drills in the right size for your job.

Joy Airvane Rotary portables are reliable in mountain cold or desert heat. In cold weather, a series of thermal by-pass valves in the oil cooling system provides instant lubrication and fast warm-up. In hottest weather, a big cooler-radiator and a highly efficient fan give Joy portables a large cooling capacity for their cfm rating. A complete line is available from 75 to 900 cfm.

Your Joy representative or nearest distributor can show you why—no matter where *your* next job—Joy has the compressor and drill team for every job. For more information write for Bulletin 2995-24.

for every job



Large mid-western quarry uses team of RP-365 compressor and TDL Trac Drill with TM 400 drill.

Contractor widens mountain roads near Niehart, Montana, with TDM Trac Drill and RP-600 team.

JOY CONSTRUCTION EQUIPMENT IS SOLD AND SERVICED BY THE JOY DISTRIBUTOR IN YOUR AREA

Portable Compressors	Trac Drills	Tungsten Carbide Rock Bits	Hand-Held Rock Drills

JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

CIRCLE 195 ON READER SERVICE CARD

Construction Reports

Bids Asked—Low Bidders—Contracts Awarded—

NEW ENGLAND

HEAVY CONSTRUCTION—BA

Mass., Springfield—BA 4/3—City, Dpt. Streets & Engineering, City Hall, Contr. 11, SANITARY SEWERS, STORM DRAINS, east of Parker St., south of Mill River. $320,000. Green Engineering Affiliates, Inc., 177 Milk St., Boston, engr. CD 11/23/60.

Mass., Reading—BA 4/6—Town, Bd. P. Wks., Municipal Bldg., 16 Lowell St., WATER FILTER PLANT ADDN. $300,000. Plans deposit $25. Kilham, Hopkins, Greeley & Brodie, 9 Arlington St., Boston, archts. Weston & Sampson, 14 Beacon St., Boston, engrs. CD 3/3/61.

BUILDINGS—BA

▲ **Mass., Easthampton**—BA 3/27—Town, Special School Bldg. Comn., HIGH SCHOOL, Williston Ave., Goryk Site. $1,000,000. Extended date. Munson & Mallis, Inc., 6 Frost St., Springfield, archt. William A. Boucher, 4-4 Hadley St., Springfield, engr. CD 1/30/61.

Mass., Fitchburg—BA 3/28—Commonwealth Mass., Dpt. Educ., Div. Bldg. Constr., 38 Chauncy St., Boston, E-59-11 Contr. 1, POWER PLANT IMPRVS., State Teachers College. $141,696. R. D. Kimball Co., 6 Beacon St., Boston, engr. CD 7/16/58.

Mass., Kingston—BA 4/4—Silver Lake Regional School Dist., Pembroke St., Silver Lake REGIONAL HIGH SCHOOL ADDN. $440,000. Plans deposit $50. Extended date. Walter M. Gaffney Assoc., W. Main St., Hyannis, archts. CD 3/8/61.

HEAVY CONSTRUCTION—LB & CA

MASSACHUSETTS—Commonwealth Mass., Dpt. P. Wks., 100 Nashua St., Boston, Bids opened 3/7, ROAD,

Scavone Constr. Co., Inc., 39 Hope Ave., Worcester, Mass., LB **$329,075**, est. $382,122, (12 bidders), hy. work, Rte. 9, Amherst-Belchertown. CD 3/2/61.

J. J. Struzziery Co., Inc., 4 Pearl St., Dedham, Mass., LB Alt. A **$99,535**, LB Alt. B **$127,353**, est. $100,000, (24 bidders), furnish, install factory built SEWAGE PUMPING STATION and WET WELL, WAKEFIELD, MASS. Town, Bd. P. Wks., 1 Lafayette St., Wakefield, Mass. BA 3/8 CD 2/16/61.

BUILDINGS—LB & CA

▲ **C. Profenno Co.**, 127 Marginal Way, Portland, Me., LB **$1,213,600** JUNIOR HIGH SCHOOL, East Ave. and Montello St., LEWISTON, ME. City, Controller, City Hall, Lewiston, Me. BA 3/8. CD 2/14/61.

▲ **Memorial Hospital, Bd. Trustees & Bldg. Comn.**, 8 Prospect St., Nashua, N. H., cancelled bids to have been opened Mar. 15, HOSPITAL ADDN., ALTERATIONS, Prospect St., NASHUA, N. H. **$1,000,000**, Markus & Nocka, 251 Columbus Ave., Boston, Mass., archts. CD 2/27/61.

The Master Corp., c/o Old Town Road Properties, Wilmington, Vt., Owner Builds, **$860,000**, SKI-LODGE DEVELOPMENT, 60 duplex coop units, ski club, store center, 9 hole golf course, WILMINGTON, VT. Bruce C. Graham, 36 East 61st St., New York 21, N. Y., archt.

Sawyer Constr. Co., Blanchard Rd., Burlington, Mass., LB **$986,000**, (10 bidders), ELEMENTARY SCHOOL, High and Bartlett Sts., Charleston, BOSTON, MASS. City, Dpt. School Bldgs., 26 Norman St., Boston, Mass. BA 3/8. CD 2/15/61.

Anderson-Fairoaks, Inc., 227 Newfield St., Hartford, Conn., CA **$512,000**, 60 unit HOUSING for Elderly, Burnside Site, Proj. E-6, EAST HARTFORD, CONN. East Hartford, Housing Auth., 62 Columbus St., East Hartford, Conn. BA 2/23/61. CD 3/1/61 under LB.

▲ **S. S. K. Corp.**, South Norwalk, Conn., Owner Builds, **$1,015,000**, 70 HOUSES, Bigelow Rd., NEW FAIRFIELD, CONN. CD 3/7/61.

▲ **Leonard L. Farber Co., Inc.**, 342 Madison Ave., New York, N. Y., Owner Builds. **$1,145,000**, 120,000 sq. ft. Amity Road SHOPPING CENTER, Amity Rd., NEW HAVEN, CONN.

▲ **Pace Builders, Inc.**, 76 E. State St., Westport, Conn., Owner Builds, **$2,500,000**, 250 HOUSES, Orange Country Club Area, ORANGE, CONN. Charles A. Cahn, 82 Audubon St., New Haven, Conn., engr.

▲ **Hayes Constr. Co.**, 1285 East St., New Britain, Conn., CA **$1,324,000**, Proj. No. CH-Conn-11(DS), STUDENT DORMITORY, FACULTY RESIDENCE, STUDENT UNION, Asylum Ave., WEST HARTFORD, CONN. St. Joseph College, 1678 Asylum Ave., West Hartford, Conn. BA 2/24/61, CA 3/9/61. CD 3/1/61, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

† **N. Y., Ilion**—BA 3/27—General Service Admin., 250 Hudson St., New York, Zone 13, MAILING PLATFORM and RAMP INMPRVS. U. S. Post Office, Job Order 80,277.

Pa., Phila.—BA 3/28—Dpt. Procurement, City Hall Annex, Bid No. 2736, constr. WATER MAIN, Former Packer Ave. from Swanson St. to Dead End in Former Packer Ave., Food Distribution Center, Sect. No. 6; Bid 2737, Waterproofing raw water conduits at pre-treatment chemical bldg., Torresdale Filter Plant, State Road between Linden Avenue and Pennypack St.; Bid No. 273 repairing wall and furnishing and installing New Chain Link Fence, drainage system, conc. sidewalk and all appurtenances work at Distribution Pipe Storage Yard, 28th and Cambria Sts. Plans deposit $5. CD 11/8/58.

New Jersey—BA 3/30—New Jersey Turnpike Auth., Administration Bldg., New Brunswick, Contr. No. R-98, furnishing five new ANTENNA TOWERS; dismantling, erecting an existing antenna tower; changes and addition to existing radio tower antenna sys.; furnishing two prefabricated steel bldgs., etc., along entire length New Jersey Turnpike. Plans deposit $10.

BUILDINGS—BA

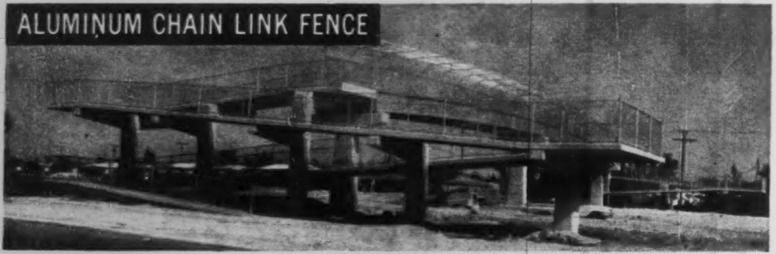
N. Y., Brooklyn — BA 3/31 — New York City Transit Auth., Rm. 1310, 370 Jay St., Zone 1, Contr. MS-25-R-1, general constr.; Contr. MS-125R-2, plumbing; Contr. MS-125R-3, heating and Contr. MS-125R-4, electrical work, addns., alterations at CENTRAL SHOP, Maintenance-of-Way, Bergen St., Brooklyn Boro.

N. Y., New York—BA 3/31—New York Telephone Co., 140 West St., Zone 7, (selected list bidders), Section "C" ADDN., Cruger Ave. OFFICE. $500,000. Voorhees, Walker, Smith, Smith & Haines, 101 Park Ave., Zone 17, archts.

New York—BA 4/6—Power Authority of State of New York, The Coliseum Tower, 18 Floor, 10 Columbus Circle, New York 19, N. Y., 50 x 175 ft. ADMINISTRATION BLDG. for Niagara Power Proj., Lewiston, Niagara Co., Spec. No. PA-N-23041, Niagara Contr. No. N32. Plans $10 per initial set of contract documents and $5 per set of addnl. sets, no part of which will be refunded. Uhl, Hall & Rich, 230 Congress St., Boston 10, Mass., engrs. CD 8/15/57, under Earthwork.

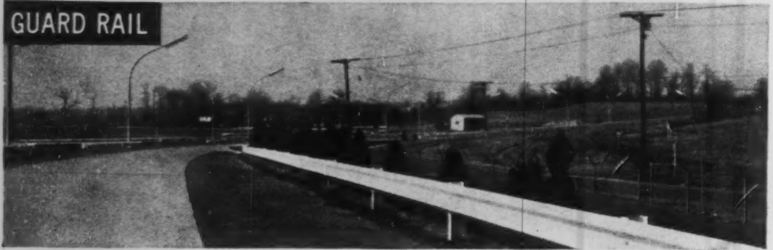
Md., Kensington—BA 4/10—Archdiocese of Washington, 1721 Rhode Island Ave. N.W., Wash., D. C., Holy Cross CHURCH and SCHOOL, Strathmore Ave. Anthony Campitelli, 7961 Eastern Ave., Silver Spring, archt. CD 12/29/60.

(Continued on page 198)



Pedestrian overpass, Palmetto Expressway, Miami, Florida.

STEEL CHAIN LINK FENCE
ANCHOR FENCE
BALTIMORE MARYLAND



Anchor's added values can add to your profit

- Technical Assistance
- Experience, Reliability
- Nationwide Service
- Prompt Erecting

How do you choose your subcontractor for fencing and guard rail when the bids are close? Naturally, you look at the intangibles—the *added values* that can make a big difference in your profit on the finished job.

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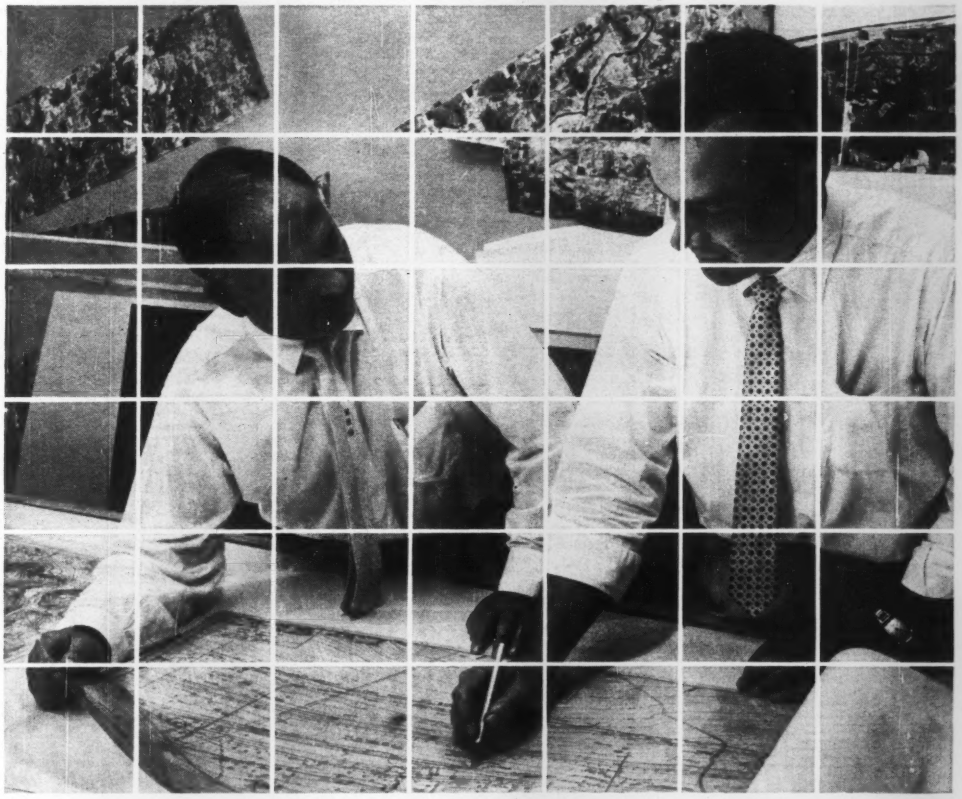
CIRCLE 196 ON READER SERVICE CARD

Mr. Sandbeck (left) and Rex Judkins, LKB engineer, inspect finished roadway plan on CRONAFLEX.



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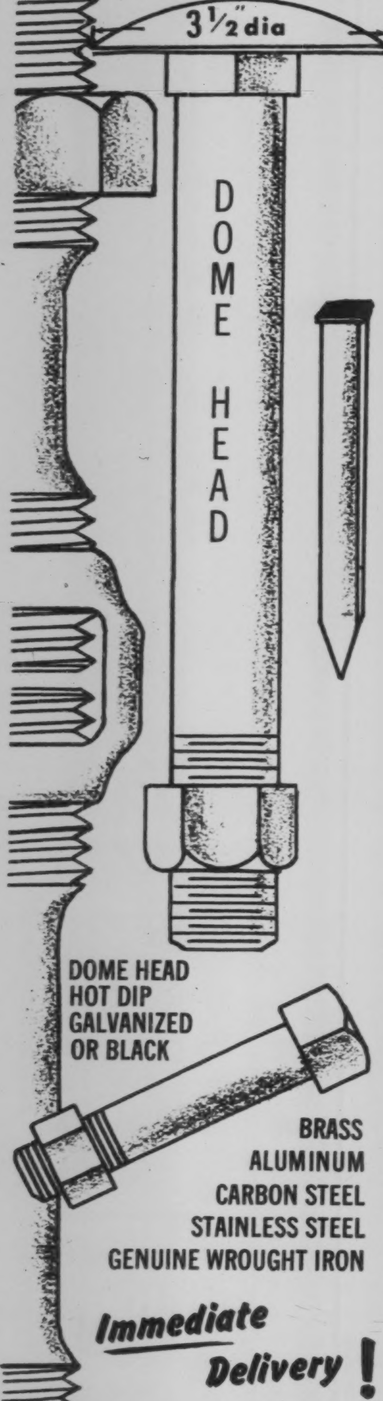

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CIRCLE 198 ON READER SERVICE CARD

(Continued from page 196)

▲ **N. J., New Brunswick**—BA 4/11—Rutgers University, Rm. 101, Queens Bldg., Contrs. (1) general constr. (2) structural steel, misc. metal work (3) heating, ventilating and air-conditioning (4) plumbing and drainage work (5) electrical work GRADUATE SCHOOL OF EDUCATION. Plans deposit $50 (certified check required). Diehl & Stein, 40 Witherspoon St., Princeton, archts. CD 5/4/60.

▲ **Pa., Phila.**—Bids Asked—Maimondes Hospital, c/o Bernard Weinberg, 2200 Parkway, Phila., 100 beds, Maimondes HOSPITAL, $1,000,000. Sabatino & Fishman, 1503 Walnut St., archts. Axel Shultz, Belvoire and Johnson Rds., Norristown, engrs.

BUILDINGS—SLC

▲ **N. Y., Manhasset**—North Shore Hospital, Valley Rd., soon lets contract, HOSPITAL ADDN. $3,000,000. Ferrenz & Taylor, 152 W. 42 St., New York, Zone 36, archts. CD 3/1/61.

HEAVY CONSTRUCTION—LB & CA

Nassau Constr. Co., Inc., 69-34 51 Ave., Woodside 77, N. Y., LB **$697,796**, (7 bidders), installation concrete STATION PLATFORMS, Ditmas Ave., Avenue I, 22 Ave., Avenue N, Avenue P, Kings Highway, Avenue U, Avenue X and Van Sicklen Stations, Sixth Ave. (Culver) Line, Brooklyn Boro (Contract Yard), BROOKLYN, N. Y. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. BA 3/10. CD 2/15/61.

▲† **Colonial Constr. Co. Ltd.**, P.O. Box 341, St. John's, Newfoundland, LB **$1,374,000**, (9 bidders), 1 story, 36,500 sq. ft. Dependent HIGH SCHOOL; 1 story, 46x78 ft. CHAPEL, EDUCATIONAL WING; 1 story, 60x144 ft. BASE OPERATIONS; 1 story, 40x42 ft. RAPCON CENTER ADDN., Ernest Harmon Air Force Base, ENG-30-347-61-20, ST. JOHN'S, NEWFOUNDLAND. U. S. Eng., 346 Broadway, New York 13, N. Y., U.S.A. BA 3/9. CD 2/9/61, under Public Buildings.

† **American Dredging Co.**, 12 South 12th St., Phila., Pa., LB **$146,102**, (3 bidders), DREDGING Manasquan Inlet, Toms River, No. 36-109-61-26, NEW JERSEY. U. S. Eng., 2635 Abbottsford Rd., Phila., Pa. BA 3/2/61. CD 2/21/61.

▲ **D'Annunzio Bros. Inc.**, Scotch Plains, N. J., LB **$337,452**, Contr. 2, SEWERS, LB **$447,315**, Contr. 3, SEWERS, CARNEYS POINT, N. J. Upper Penns Neck Twp. Sewerage Auth., 118 C St., Carneys Point, N. J. Skinner & Compton, 114 West Broadway, Salem, N. J., engrs., CD 2/8/60;
McElwee Courbis Constr. Co., Inc., 6209 Crescent Blvd., Pennsauken, N. J., LB **$433,539**, Contr. 1, SEWAGE TREATMENT PLANT, (Craneys Point, N. J.).

▲ **McClain Constr. Co.**, 200 South 13th St., Phila., Pa., CA **$1,035,326**, SEWAGE TREATMENT PLANT, SANITARY SEWERS, PUMPING STATIONS, CLEMENTON, N. J. Clementon Sewage Auth., Clementon, N. J. John G. Reutter, 729 Federal St., Camden, N. J., engr.

C. H. Winans Co., 616 First St., Roselle, N. J., CA **$237,750**, EXTENSION of TERMINAL STREET southward, PORT NEWARK, N. J. Port of New York Auth., 111 8th Ave., New York, N. Y. CD 12/2/55, under Unclassified.

Edward Ihnen & Son, Inc., 2 Railroad Ave., Montvale, N. J., CA Est. **$140,000**, SWIMMING POOL adjoining former municipal disposal plant, Tenney Ave., RIVER EDGE, N. J. River Edge Swim Club, 215 Adams Ave., River Edge, N. J. Walter H. Richters, 321 Olympia Dr., River Edge, N. Y., archt. CD 7/29/60.

Araco Constr. & Realty Co., Inc., 918 Courtland St., Phila., Pa., LB **$323,784**, SEWAGE TREATMENT PLANT ADDN., SEASIDE HEIGHTS, N. J. Seaside Heights Boro, Municipal Bldg., Seaside Heights, N. J. BA 3/1/61. CD 1/30/61.

PENNSYLVANIA—State Hy. Dpt., 506 North Office Bldg., Harrisburg, BRIDGE,
Brayman Constr. Corp., Gibsonia, Pa., CA **$756,049**, constr. Kennywood Bridge on Traffic Route 837, Duquesne Co.

Laub Constr. Co., Inc., 1405 Locust St., Phila., Pa., LB **$732,600**, SEWAGE TREATMENT WORKS, AMBLER, PA. Boro of Ambler, Boro Hall, Ambler, Pa. BA 2/27/61. CD 2/17/61.

Dpt. Procurement, City Hall Annex, Phila., Pa., cancelled bids to have been opened Mar. 28, Bid No. 2737, waterproofing of RAW WATER CONDUITS at pre-treatment chemical bldg., Torresdale Filter Plant, State Rd. between Linden Ave. and Pennypack St., PHILA., PA. CD 3/13/61.

† **U. S. Eng.**, First and Douglas Sts., N. W., Wash. 25, D. C., cancelled bids to have been opened Mar. 7, DINING HALL, John H. Towers Field, ENG-49-080-61-38(36), ANDREWS AIR FORCE BASE, MD. **$500,000.** CD 2/10/61.

† **Frank M. Dorsey & Sons, Inc.**, 820 Michigan Ave. N.E., Wash., D. C., LB **$224,250**, (5 bidders), ROADS, WALKS, GRADING, etc., Gallaudet College, WASH., D. C., General Services Admin., 7th and D Sts. SW, Wash., D. C. BA 3/7/61. CD 2/1/61.

▲ **Binkele Constr. Co.**, 315 W. Mifflin St., Lancaster, Pa., LB **$886,633**, SEWAGE TREATMENT PLANT, LEWES, DEL. Town, Town Hall, Lewes, Del., BA 2/27/61, CD 1/31/61.;
Edgell Constr. Co., Mary St., Dover, Del., LB **$345,656**, SANITARY SEWERS, (Lewes, Del.).

BUILDINGS—LB & CA

Leon D. De Matteis Constr. Co., 827 Elmont Rd., Elmont, N. Y., CA **$687,000**, STUDENT NURSE DORMITORY,

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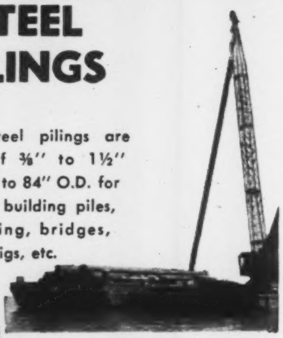

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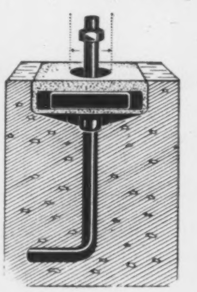

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Long Island College Hospital, BROOKLYN, N. Y. Long Island College Hospital, Henry and Pacific Sts., Brooklyn 1, N. Y. BA 2/27. CD 3/2/61, under LB.

▲ **Green Constr. Co.**, 274 Madison Ave., New York 16, N. Y., CA **$1,523,250**, general contract, incl. site work, JUNIOR HIGH SCHOOL, NORTH BABYLON, N. Y. Bd. Educ., U.F.S.D. No. 3, Weeks Rd., North Babylon, N. Y. **(Correction**—contractor). CD 3/1/61, under CA.

The John W. Cowper Co., P.O. Box 3043, Buffalo 5, N. Y., LB **$308,589**, (7 bidders), general constr. HEATING SERVICE CONNECTIONS, State School for Mentally Retarded, WEST SENECA, N. Y. State Dpt. P. Wks., State Office Bldg., Albany, N. Y. BA 3/8. CD 3/2/61.

▲ **Mark Feldman**, 38 Watson Ave., Elizabeth, N. J., Owner Builds, **$1,000,000**, 30 HOUSES, off Wheatsheaf St., CLARK, N. J. H. B. Southern, 571 East Hazelwood Ave., Rahway, N. J., archt. Casey & Keller, 1000 Springfield Ave., Irvington, N. J., engrs.

Alfred Sanzari, 90 West Franklin St., Hackensack, N. J., Owner Builds, **$550,000**, 28 HOUSES, Industrial Ave., WOOD-RIDGE, N. J. C. J. Kordys, 1389 Hamburg Turnpike, Wayne, N. J., archt. Canger Engineering Assoc., 6-20 Plaza Rd., Fairlawn, N. J., engrs.

▲ **Spera Constr. Co.**, 16th and Chestnut Sts., Camp Hill, Pa., CA **$2,424,059**, general contract Holy Spirit HOSPITAL, CAMP HILL, PA. Sisters of Christian Charity, 605 N. 2nd St., Harrisburg, Pa. BA 2/8/61. CD 2/10/61, under LB;
G. R. Sponaugle & Son, Inc., 4391 Chamber Hill Rd., Harrisburg, Pa., CA **$1,276,684**, mechanical constr. Holy Spirit HOSPITAL (Camp Hill, Pa.).

▲ **National Land & Investment Co.**, c/o Bernard Weinberg, Park Towne Apartments, Phila., Pa., Owner Builds **$2,000,000**, RESIDENTIAL DEVELOPMENT, Lakeside Rd., etc., DEVON, PA.

Woodbrook Estates c/o Charles H. Helms, 1518 Walnut St., Phila., Pa., Owner Builds, **$400,000**, RESIDENTIAL DEVELOPMENT, Route 202, DOYLESTOWN, PA.

Coldstream Corp., c/o Joseph E. Hefferman, Conshohocken, Pa., Owner Builds, **$750,000**, RESIDENTIAL DEVELOPMENTS (28) Conshohocken State Rd., GLADWYNNE, PA. Matthew Wurm, Wayne, Pa., archt.

▲ **A & J Di Marco**, 9726 Bustleton Ave., Phila., Pa., Owner Builds, **$1,000,000**, APARTMENT (172 apartments) Blue Grass Rd., PHILA., PA.

▲ **Louis Blumberg & Albert Waber**, 435 E. Wyoming Ave., Phila., Pa. Owner Builds, **$1,500,000**, RESIDENTIAL DEVELOPMENT (124) Bustleton Ave., etc., PHILA., PA.

Homer E. Strock, Springtown, Pa., Owner Builds, **$400,000**, RESIDENTIAL DEVELOPMENT (29) SPRINGTOWN, PA.

G. M. McCrossin, Inc., 129 West Linn St., Bellefonte, Pa., LB **$384,700**, PIPING and MECHANICAL CONSTR., EXTENSION and REVISION of UTILITIES, Pennsylvania State University, UNIVERSITY PARK, PA. General State Authority, 18th and Herr Sts., Harrisburg, Pa., BA 3/8/61. CD 2/17/61.

▲ **Kearney Constr. Co.**, 7996 Rockwell Ave., Phila., Pa., Owner Builds. Over **$2,500,000**, RESIDENTIAL DEVELOPMENTS, 171 homes, Davisville Rd., WARMINSTER, PA.

▲† **Piracci Constr. Co., Inc.**, 2552 Woodbrook Ave., Baltimore 17, Md., CA **$1,461,000**, second 3 story Army MEDICAL LABORATORY, Inv. No. ENG-18-020-61-19, FORT GEORGE G. MEADE, MD. U. S. Eng., 24 St. and Maryland Ave., Baltimore 18, Md. BA 2/28. CD 3/9/61, under LB.

▲† **Frazier-Davis Constr. Co.**, 1319 Macklind, St. Louis, Mo. and **MacDonald Constr. Co.**, 1310 So. Grand Ave., St. Louis, Mo., CA **$4,569,937**, ADDITIONAL FACILITIES, FORT RITCHIE, MD. U. S. Eng., First and Douglas Sts. N.W., Wash., D. C. CD 6/2/59.

▲ **Roscoe Ajax, Inc.**, 1107-19th St. N.W., Wash., D. C., CA Est. **$3,000,000**, 14 story concrete, masonry HOTEL and GARAGE, 1177 15th St. N.W., WASH., D. C. Hilda K. Wine, 4000 Cathedral Ave. N.W., Wash., D. C. Edwin Weithe, 810 18th St. N.W., Wash., D. C., archt.

▲ **George A. Fuller Co.**, Munsey Bldg., Wash., D. C., CA Est. over **$1,000,000**, 12 story OFFICE and GARAGE, 1701 Pennsylvania Ave. N.W., WASH., D. C. International Bank of Washington, 1625 Eye St. N.W., Wash., D. C. BA 1/31/61. CD 1/3/61.

SOUTH

HEAVY CONSTRUCTION—BA

† **N. C., Winston-Salem**—BA 3/28—Base Procurement, Pope Air Force Base, MODIFICATION four airmen's DORMITORIES at Winston-Salem Air Force Base, IFB-31-601-36B.

† **Fla., Homestead**—BA 4/4—Base Procurement Office, Bldg. 472, Homestead Air Force Base, FURNISH, ERECT PREFABRICATED METAL BLDG., Homestead Air Force Base, IFB-08-621-61-31. CD 9/2/60.

† **MISSISSIPPI**—BA 4/4—At office Div. Engr. Bureau P. Rds,. Dpt. Commerce, First National Bank Bldg., Florence, Ala., ROAD,
Chickasaw, Webster and Clay Counties—b. conc. pavt., stabilized shoulders 24.733 mi. Miss. Hy. 32 to Miss. 15, Natchez Trace Parkway, Proj. 3F20-3G19. CD 9/21/59, under Unclassified.

† **Va., Norfolk**—BA 4/4—Dist. P. Wks. Office, Fifth Naval Dist., Norfolk, Zone 11, REPLACEMENT ROOFING, Naval Air Station, NBy 33746. $250,000.

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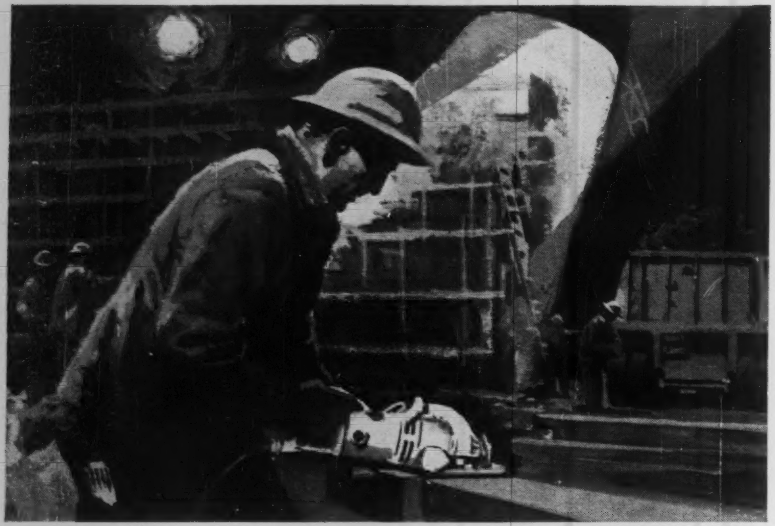

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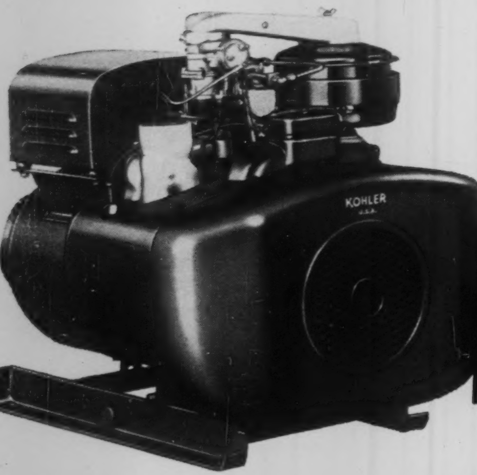

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† **Va., Oceana**—BA 4/4—Dist. P. Wks. Office, Fifth Naval Dist., Norfolk, Zone 11, PARKING AREA, TRAINING BLDG., Naval Air Station, NBy 33825, **$50,000;** RUNWAY END ZONES and CRASH STRIPS, Naval Air Station, NBy 33788. $500,000. CD 7/25/60.

† **Fla., Homestead**—BA 4/5—Base Procurement Office, Bldg. 472, Homestead Air Force Base, REPAIR RECREATION ANNEX. CD 9/25/59.

† **Fla., Eglin Air Force Base**—BA 4/6—U. S. Eng., P. O. Box 1169, Mobile, Ala., FIRE STATION, ENG-01-076-61-67B. $100,000. CD 7/22/60.

† **Georgia and South Carolina**—BA 4/6—U. S. Eng., 200 E. St. Julian St., Savannah, Ga., CEMETERY RELOCATION, Groups III, IV and V, Hartwell Project, Savannah River, CIVENG-09-133-61-20. CD 9/22/60.

† **Va., Langley Field**—BA 4/10—National Aeronautics & Space Admin., Bldg., 1195, Langely Field, design, furnish, install AIRSTREAM OSCILLATING SYS., Bldg. 198, Transonic Dynamics Tunnel, Proj. L-1473. $200,000. CD 8/16/60.

† **Fla., Eglin Air Force Base**—BA 4/12—U. S. Eng., P. O. Box 1169, Mobile, Ala., CHAPEL ADDN., ENG-01-076-61-66B. $100,000. CD 7/22/60.

† **S. C., Charleston**—BA 4/12—Dist. P. Wks. Office, 6th Naval Dist. Bldg. No. 13, Naval Base, Charleston. Renewal of BRICKWORK-BOILER NO. 12, Bldg. NO. 32, Charleston Naval Shipyard, NBy 34680, $25,000-$100,000. CD 7/22/60.

† **Fla., Eglin Air Force Base**—BA 4/13—U. S. Eng., P. O. Box 1169, Mobile, Ala., ADDN., to AMMUNITION STORAGE, MULTI-CUBICLE MAGAZINE, ENG-01-076-61-66B. $50,000. CD 7/22/60.

† **S. C., Charleston**—BA 4/19—Dist. P. Wks. Office 6th Naval Dist., Bldg. No. 13, U. S. Naval Base, Charleston, PRECISION INSTRUMENT STORAGE FACILITY, Charleston Naval Shipyard, NBy-31367, $100,000-$250,000. CD 7/22/60.

BUILDINGS—BA

S. C., Sumter—BA 4/11—Tuomey Hospital, Calhoun St., HOSPITAL ADDN., ALTERATIONS. $600,000. Plans deposit $75. James & Durant, 128 E. Liberty St., archts. CD 4/19/60.

BUILDINGS—SLC

▲ **Va., Franklin**—Southampton Memorial Hospital, Franklin, soon lets contract, 4 story, 85,000 sq. ft. steel, masonry, 107-bed HOSPITAL. $2,500,000. Marcellus Wright and Son, 100 East Main St., Richmond, archts. Blanton & Levy, 1618 Altamont Ave., Richmond, struct. engrs. W. M. Brown, 100 East Main St., Richmond, mech. engr. CD 2/17/61.

HEAVY CONSTRUCTION—LB & CA

Nardei Constr. Co., Inc., 385 Washington Ave., Bridgeville, Pa., CA **$259,921,** Contr. A-1, Weirton Heights WATER IMPROVEMENT PROGRAM, WEIRTON, W. VA. City, City Hall, Weirton, W. Va. CD 8/9/60.

SOUTH CAROLINA—State Hy. Dpt., Office Bldg., corner of Senate and Assembly Sts., Columbia, ROADS,
rejected bids Feb. 14, grading, macadam base course, b. conc. surf. constr. four lane divided hy. 4.192 mi. S.C. Dockets Nos. 23.436.1 and 23.450, F.A. Proj. Nos. I-385-2(16), U-98-3 and US 1407(1), Scheme No. 1, Greenville Co.; road work, grading, surf., F.A. Proj. No. I-385-2(16) S.C. Docket Nos. 23.436, Parts 1 and 2, Greenville Co. CD 2/2/61.

SOUTH CAROLINA—State Hy. Dpt., Office Bldg., corner of Senate and Assembly Sts., Columbia, BRIDGES,
S. C.—**Inland Bridge Co., Inc.**, P.O. Box 297, Chester, S. C., CA **$305,515,** constr. twin rein.-con., steel bridges, over Twenty-Three Mile Creek, Interstate Rte. 85, S.C. Docket No. 4.505.4, F.A. Proj. No. I-85-1(4), Anderson Co.;
S. C.—**C. & W. Constr. Co., Inc.**, P.O. Box 71, Charlotte, N. C., CA **$414,056**, constr. 210 ft. prestressed concrete underpass under Rd. S-71, Interstate Rte. 85, S.C. Docket No. 4.509, F.A. Proj. I-IG-85-1(8), Anderson Co. BA 2/14/61. CD 2/2/61.

▲ **SOUTH CAROLINA**—State Hy. Dpt., Office Bldg., corner of Senate and Assembly Sts., Columbia, ROADS,
S. C.—**Brown Paving Co.**, P.O. Box 484, Lexington, N. C., CA **$138,897**, resurf. with hot laid b. conc. surf. course, Type 1, surf. with hot laid conc. surf. course, Type 2, U.S. Rtes. 378 and 178, S.C. Docket Nos. 32.1032 and 41.1026, Lexington-Saluda Counties; CA **$116,145**, resurf. with hot laid b. conc. surf. course, Type 2, 29.16 mi. US Rtes. 15 and 15 by-pass, State Rte. 912, and roads 50 and 57, S.D. Docket No. 35.1028, Marlboro Co.; CA **$95,688**, resurf. with hot laid b. conc. surf. course, Type 2, 20.2 mi. Rds. 58 and 15, S.C. Docket No. 28.1026, Kershaw Co.; CA **$137,257**, resurf. with hot b. conc. surf. and hot plant mix sand asph. 19.4 mi. U.S. Rte. 176, S.D. Docket Nos. 8.1038 & 38.1044, Berkeley-Orangeburg Counties;
S. C.—**Dickerson, Inc.,** P.O. Box 448, Monroe, N. C., CA **$255,434,** resurf. with hot laid b. conc. surf. course Type 2, and application of bit. surf. 59.32 mi. U.S. Rtes. 21 and 21 business, State Rtes. 5, 49, 55, 72, 161, Rds. 36, 43, 90, 91, 96, 100, 151, 206, 209, 227, 416 and 588, S.C. Docket No. 46.1047, York Co.; CA **$116,100,** bit. surf. Type 1, resurf. with hot b. conc. surf. course, Type 2, 22.48 mi. State Rtes. 9 and 72, S.C. Docket Nos. 12.1039, Chester Co.;
S. C.—**Wham Constr. Co., Inc.**, Rte. No. 5, River Heights, Anderson, S. C., CA **$188,991,** grading, macadam base course, b. conc., constr. four lane divided hy., S.C. Docket Nos. 24.1066, 24.350 and 33.1022, Greenwood-McCormick Counties;
S. C.—**J. F. Cleckley & Co.**, P.O. Box 656, Orangeburg, S. C., CA **$128,845,** resurf. with hot laid b. conc. surf. course and hot plant mix sand asph. 21.2 mi.

SATISFIED CUSTOMERS* ARE THE BEST ADVERTISEMENTS FOR "CONCRETOR" HYDRAULIC SLIPFORM SERVICE

Washington Bldg., Seattle, Wash.

CONSIDER THE FOLLOWING POINTS . . .

1. AN ALL-INCLUSIVE SLIPFORM SERVICE. Jacks, yokes (adjustable and simply assembled to form), pumps, jackrods (left in walls or recovered) all delivered to job site free of charge. On-the-job qualified experienced engineers.

2. SAVES TIME AND MONEY. Eliminates need for ordering, storing and working of jackrods; not to mention building and repairing of yokes, as well as shipping expenses.

3. PRODUCES UNIFORM SIMULTANEOUS LIFTING OF FORMS AT ALL pertinent points with one man operating pumps.

4. NO JOB TOO LARGE OR TOO SMALL! Adaptable to all types of vertical construction . . . apartment houses, chimney pedestals, substructures for water reservoirs, bridge piers, silos, factories, etc.

*SATISFIED CUSTOMERS INCLUDE:

CHRISTENSEN CORPORATION, Fremont, Neb.
FRUIN-COLNON CONTRACTING CO., Indianapolis, Ind.
JOHNSON ELEVATOR CONSTRUCTION, INC., Salinas, Kan.
MARTIN K. EBY CONSTRUCTION CO., INC., Wichita, Kan.
MARK B. GARFF, RYBERG & GARFF CONSTRUCTION CO., Salt Lake City 10, Utah
HENKEL CONSTRUCTION CO., Mason City, Iowa
CHRIS JENSEN & CO., St. Paul, Minn
KLUG & SMITH CO., Milwaukee, Wis.
E. C. MACHIN, INC., Allentown, Pa.
M. & A. ENTERPRISES, INC., Denver, Colo.
J. T. McDOWELL, INC., Dallas, Texas
McNAMARA QUEBEC LTD., Montreal, Canada
PENTAGON CONSTRUCTION (1959) CO., LTD., Montreal 9, Canada
PERINI CORPORATION, Framingham, Mass.
PLUMMER ASSOCIATES, New York 7, N. Y.
PRELOAD COMPANY, INC., New York 17, N. Y.
I. REINDOLLAR & SON, INC., York, Pa.
RUST ENGINEERING COMPANY, Pittsburgh, Pa., Birmingham, Ala.
C. H. SCHWERTNER & SON, INC., Philadelphia, Pa.
WALSH CONSTRUCTION CO., New York, N. Y.
YOUNGLOVE CONSTRUCTION CO., Sioux City, Iowa

FREE: write for specifications and job studies Dept. EN-3

B. M. HEEDE, INC.

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CIRCLE 53 ON READER SERVICE CARD

U.S. Rtes. 17, 321, 601, State Rtes. 170, 462, 128 and 336, Jasper Co.;

S. C.—**Sloan Constr. Co., Inc.**, P.O. Box 747, Greenville, S. C., CA **$774,940**, b. conc. surf. for constr. four lane divided hy. 11.511 mi. Interstate Rte. 26, S.C. Docket Nos. 9.302.1 and 32.412.1, Calhoun and Lexington Counties;

S. C.—**Lexington Contg. Co.**, Box 706-F, Cayce, S. C., CA **$166,497**, grading, bit. surf. constr. concrete curb and gutter, 3.997 mi. US Routes 276, 7, 25, Rds. S-103, S-22, S-280, S-281, S-165, S-167, S-88, S.C. Docket Nos. 23.472, 23.473 and 23.474, Greenville Co.;

S. C.—**Harbert Constr. Corp.**, P.O. Box 1369, Birmingham 1, Ala., CA **$2,834,587**, grading, macadam base course, b. conc. surf., constr. four lane divided hy., Interstate Rte. 385, Scheme No. 2, S.C. Docket No. 23.436, Parts 1 and 2, F.A. Proj. No. I-385-2 (16), Greenville Co.;

S. C.—**Douglass Constr. Co.**, P.O. Box 1104, Columbia, S. C., CA **$117,267**, resurf. with hot laid asph. 23.2 mi. US Rtes. 21 and 176, S.C. Docket No. 40.1-73, Richland Co. Grand total $5,130,648. CD 2/2/61.

† **M. B. Kahn Constr. Co.**, 1113 Blossom St., Columbia, S. C., CA **$676,000**, MULTI-PURPOSE BLDG. EXTENSION to machine shop and hydraulic repair facilities, Charleston Naval Shipyard, NBy 31328, CHARLESTON, S. C. P. Wks. Office, U. S. Navy, Naval Base, Charleston, S. C. BA 3/2/61. CD 3/7/61, under LB.

M. K. McKnight & Son, 1498 Wrightsboro Rd., Augusta, Ga., CA Est. **$125,000**, ICE SKATING RINK, NORTH AUGUSTA, S. C. Ice Palace, Inc., 1498 Wrightsboro Rd., Augusta, Ga.

▲† **The Lane Constr. Corp.**, Box 911, Meriden, Conn., LB **$2,625,791** (13 bidders), RUNWAY, TAXIWAY and APRON PAVING, Hazard removal ILS outer marker and runway paving repairs, Homestead Air Force Base, ENG-08-123-61-51, HOMESTEAD, FLA. U. S. Eng., Box 4970, Jacksonville, Fla. BA 3/8/61. CD 2/2/61.

† **Arnold M. Diamond, Inc.**, 115 Middle Neck Rd., Great Neck, N. Y., LB **$172,419**, JET AIRCRAFT FULL POWER CHECK FACILITY, U. S. Naval Air Station, Cecil Field, NB7-29134, JACKSONVILLE, FLA. Dist. P. Wks. Office, U. S. Naval Base, Charleston, S. C. BA 3/8/61. CD 2/3/61.

Cleary Bros. Constr. Co., Box 6397 W. Palm Beach, Fla., LB **$179,215** (5 bidders), mainland BULKHEAD and STORM DRAINAGE for Port Miami, vicinity Bayfront Park, MIAMI, FLA. Bd. Comrs., Dade Co., Courthouse, Miami, Fla. BA 3/8/61. CD 2/21/61.

E. C. Ernst Co., 657 Antoine St., Atlanta, Ga., LB **$380,524**, est. $400,000, downtown LIGHTING SYSTEM, MOBILE, ALA. City, City Hall, Mobile, Ala. BA 3/7/61. CD 8/3/59.

▲ **KENTUCKY**—Commonwealth Ky., Dpt. Hys., Frankfort, ROAD,

Greer Bros. & Young, Inc., N. Main St., London, Ky., CA **$1,554,655**, grade, drain, incid. surf. 3.022 mi. Covington-Tennessee State Line, I 75-6 (8) 138, Scott Co. BA 2/28. CA 3/10. CD 3/7/61, under LB.

BUILDINGS—LB & CA

M. T. Broyhill & Sons, 4610 Lee Hy., Arlington, Va., Owner Builds, **$713,000**, Section III, 23 HOMES, Langley Estates, LANGLEY, VA. CD 4/12/60.

Rea Constr. Co., P.O. Box 1092, Charlotte, N. C., CA **$878,400**, LAW SCHOOL, DURHAM, N. C. Duke University, Admin. Bldg., Durham, N. C. BA 2/23/61. CA 3/8/61. CD 3/3/61, under LB.

J. B. Perry, Forest Lake Shopping Center, Columbia, S. C., Owner Builds, **$450,000**, 29 RESIDENCES, Haven Heights subdivision, COLUMBIA, S. C.

Lancaster Co. Bd. Educ., Courthouse, Lancaster, S. C., rejected bids Feb. 23, JUNIOR HIGH SCHOOL ADDN., ALTERATIONS, LANCASTER, S. C. LB **$539,000**. CD 3/6/61, under LB.

▲ **T. L. Kiker Co.**, 928 Brown St., Dalton, Ga., LB Est. **$2,000,000** (2 bidders), SHOPPING CENTER, DALTON, GA. W. I. Manton & Wallace M. Bryant, Dalton, Ga. BA 3/7/61. CD 3/6/61.

† **Wesley of Florida, Inc.**, P.O. Box 4158, Jacksonville, Fla., CA **$587,911**, ALTERATIONS, ADDNS., BLDG. 38 and connecting corridor between Bldgs. 62 and 64, LAKE CITY, FLA. Veterans Admin., Munitions Bldg., Wash., D. C. BA 2/28/61. CA 3/7/61. CD 3/6/61, under LB.

▲ **Richardson Constr. Co.**, 645 N.W. 7th Ave., Fort Lauderdale, Fla., CA **$1,379,900**, Brevard HOSPITAL, MELBOURNE, FLA. Brevard Hospital Assocs., N. Dixie Hy., Melbourne, Fla. Strickland & Assocs., 701 S. 37th St., Birmingham, Ala., engrs. BA 3/2/61. CA 3/7/61. CD 3/9/61, under LB.

Charles Bromer, 2979 Flamingo Dr., Miami, Fla., CA Est. **$750,000**, MFG. PLANT, IPCO Road and Miami Gardens Rd., MIAMI, FLA. Air Control Products, Inc., 3601 N.W. 54th St., Miami, Fla. CD 3/9/61.

† **Charles E. Storey**, Benton, Ky., CA **$899,000**, (A) ELEMENTARY SCHOOL, FORT CAMPBELL, KY. Housing & Home Finance Agency, Region 3, 645 Peachtree St. N.E., Atlanta, Ga. BA 3/7. CA 3/7. CD 2/20/61.

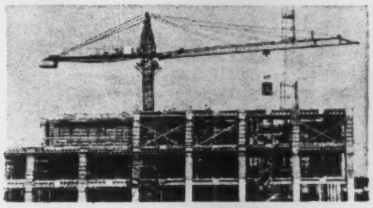
C. & I. Specialty Co., 3102 Dodds Ave., Chattanooga, Tenn., LB **$649,302**, Hixson ELEMENTARY SCHOOL, CHATTANOOGA, TENN. Hamilton Co. Bd. Educ., Courthouse, Chattanooga, Tenn. BA 3/7/61. CD 2/21/61.

C. L. Hyatte, 1500 University Ave., Knoxville, Tenn., Owner Builds, **$460,000**, 27 RESIDENCES, Hyatte subdivision, KNOXVILLE, TENN.

▲ **Raines Bros. Co.**, 209 Minor St., Chattanooga, Tenn., CA Est. **$1,000,000**, SHOPPING CENTER, Clinton Hy., KNOXVILLE, TENN. Clinton Plaza Shopping Center, c/o contractor.

(Continued on page 204)

HOW "CONCRETOR" The Linden Crane CLIMBING-CRANES REVERSE RISING CONSTRUCTION COSTS



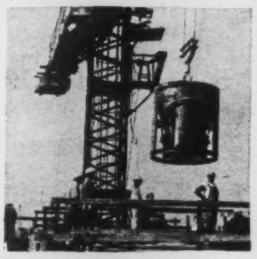
Peter Kiewit Sons utilizes "CONCRETOR" CLIMBING-CRANE in effecting important savings of time, labor, money on own office building in Omaha, Nebraska.

The "CONCRETOR" CLIMBING-CRANE goes up with the building while work is in progress . . . 2-3 floors at a time . . . the sky's the limit. Climbs by its own hoisting winch on floors or inside elevator shafts.

"CONCRETOR" CLIMBING-CRANES efficiently place loads "on a dime" . . . up to 100 foot radius due to the 360 degree swing of its 100 foot jib. They eliminate the need for expensive rehandling of materials over unnecessary ramps and runways, substantially lowering operating costs. Recommended for all types of construction including industrial, apartment and office buildings, silos, water towers, bridges and viaducts.

"CONCRETOR" CLIMBING-CRANES cost about half of what you'd expect to pay for earth-bound cranes of similar capacity. With ordinary use, the cost can be amortized over a period of about 2 years.

CHOICE OF 4 MODELS — RENTAL/ PURCHASE PLANS. Delivered anywhere in U. S. Factory-trained service engineers available.



Crane is remote-controlled by one man from working deck with 3½ lb. electronic panel.

For Literature Address Dept. EN-3C

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B. M. HEEDE CALIFORNIA, INC.
630 Sixth Street, San Francisco 3, California

CIRCLE 201 ON READER SERVICE CARD

LW Haulpak® proves itself again...

Comparative figures show 18.2% extra production

PERFORMANCE REPORT

CONDITIONS: Hauling top soil, subsoil, and clay loam overburden an average distance of 7,100 feet with an average 1.3% adverse grade. Maximum adverse grade was 400 feet of 5%.

MACHINES: LeTourneau-Westinghouse 32-ton Haulpaks and 22-ton trucks of another make. Loaded by a 4½-yd shovel.

PRODUCTION COMPARISONS: (16 loads weighed and timed.) Haulpaks averaged 30.9 tons per load, or 96.5% of rated capacity . . . to 19.05 tons or 87% of capacity of other trucks. Haulpak completed cycles in an average of 8.58 minutes compared to 9.5 minutes for the other trucks. Haulpak's speed and faster haul time is especially impressive when you consider LW load time of 1.26 minutes, to .96 minutes for the smaller-capacity truck. Production per 50-minute hour, per truck: Haulpak, 179 tons . . . other truck, 101 tons.

Hourly production for two 32-ton Haulpaks (two operators) . . . 358 tons. For three 22-ton trucks (three operators) . . . 303 tons.

COST AND PRODUCTION COMPARISONS: Although two of these Haulpaks sell for only 1.4% more than three of the smaller trucks, difference in production is amazingly high.

. . . 18.2% ABOVE THAT OF OTHER TRUCKS!

This detailed performance report is the result of studies made at a large cement plant quarry. Impressive conclusion? You bet it is! In fact, no other truck in the industry can compare with the production ability of the LeTourneau-Westinghouse Haulpak.

The reason is simply this: Haulpak is made up with a group of *proven* components (see opposite page), put together in a way that no one else has been able to do. It was built from the ground up *as an off-road hauler;* it is not just a beefed-up highway truck. *Everything* you see in the LW Haulpak truck has been carefully engineered with one objective: *To give you a NEW low-cost-per-ton-mile on your off-road hauling!*

Haulpak dumps another load at waste area. Twin three-stage hydraulic hoists raise body a full 70°, give complete load-ejection in just 16 seconds. Hoist-rams are inverted to shed dirt.

FLASH! Just as this report was ready for printing, owner of the Haulpaks used in this production study purchased 3 *additional LW Model 32 Haulpaks.* That makes a total of 6 in their fleet . . . further proof of satisfied performance!

Here are some of Haulpak's cost-cutting advantages:

"Bonus-tonnage" V-body: carries about 6 tons of material *below* normal floor line, provides low center of gravity . . . *Hydrair® suspension:* air-hydraulic suspension system cushions load and road shocks, eliminates springs, front-axle, and their related maintenance . . . *Power-Transfer Differential:* automatically transfers power to drive-wheel on best footing . . . *Short turn circle:* turns in ⅓ less space than comparable-capacity haulers, and *much shorter* than many smaller rigs — greatly reduces maneuvering and cycle time . . . *Aluminum-alloy fan**: cools engine with less than half the hp drain of conventional fans. Thermostat shuts off fan when not needed, saves its 10 hp for extra work power . . . *Biggest Brakes in the Industry:* up to 10,186 sq inches of total braking surface.

Let us show you more proof of LW Haulpak's cost-cutting abilities. We will also arrange a demonstration so you can *see* these trucks in action. Five sizes, 22 to 60 tons . . . up to 550 hp. Ask for complete details.

*Applies to 4 larger-size Haulpaks HP-2350-MQJ-2

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

CIRCLE 203 ON READER SERVICE CARD

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HIGH STRENGTH
RATTLE-PROOF
ALUMINUM GRATING DESIGN
NEW from KERRIGAN ....
A SUPERIOR OPEN ALUMINUM FLOOR
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CHECK THESE
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When Specifying Aluminum Grating . . .
PERMANENTLY-LOCKED BARS
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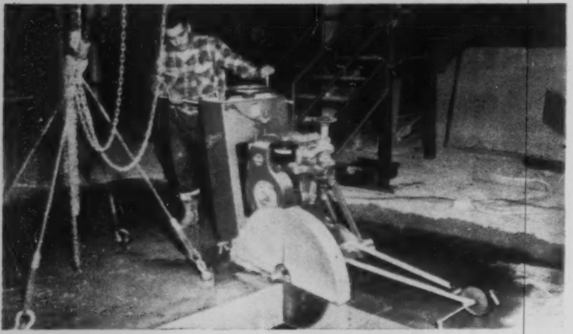


TRUCO®
DOES
IT
AGAIN!

Makes history by sawing 11½" thick, 5000 lb. test concrete reinforced with 2 layers of ½" rods on 8" centers. Big slab sawed out in 3½ hrs.

PROJECT: Wind tunnel at government research base. **CONTRACTOR**: Nash Drilling Co., Ltd., Montreal, P.Q. **EQUIPMENT**: Truco 18 H.P. Economy Concrete Saw; Truco Tru-Bond Diamond Blade 26" dia. $\frac{3}{16}$" thick. **JOB**: Cut an inspection opening 10'0" x 5'0" in 5000 lb. test concrete reinforced with 2 layers of reinforcing rods ½" dia., placed on 8" centers. Slab was marked off in two 5'x5' sections, and 3" holes drilled in the four corners of each section to receive fastenings for cables to support slabs. Four cuts released the first slab for removal. There more cuts released the second slab. The 26" dia. Truco Diamond Saw made a 10½" cut and the remaining concrete on the wavy underside (about 1") easily broke away when the slab was lifted. Actual cutting time was only 3½ hours and the entire job was easily done in one day. Savings are so great Truco Diamond Drilling and Sawing Equipment may pay for itself on a single job or in a single day. Send for new Truco catalog.

MASONRY DRILLING DIVISION
WHEEL TRUEING TOOL COMPANY
188B-3200 W. Davison, Detroit 38, Mich. • 575 Langlois, Windsor, Ont.

(Continued from page 201)

G. Marcus Jones, P.O. Box 69, Morristown, Tenn., LB **$443,000**, Soldier Memorial ELEMENTARY SCHOOL, Tazewell, NEW TAZEWELL, TENN. Claiborne Co. Bd. Education, New Tazewell, Tenn. BA 3/4/61. CD 2/23/61.

Sam & Will Melson, P.O. Box 201, Shelbyville, Tenn., Owner Builds, **$500,000**, SHOPPING CENTER, Unionville Hy., SHELBYVILLE, TENN. CD 1/16/61.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

† **Wis., Milwaukee** — BA 3/28 — U. S. Eng., 1819 Pershing Rd., Chicago, Ill., PARACHUTE SHOP CENTER, Mitchell Field, No. 11-032-61-58. $200,000. CD 3/2/54.

Ind., Columbus—BA 3/29—U. S. Eng., 1819 Pershing Rd., Chicago, Ill., Sched. A, RUNWAY OVERRUNS and FIRE STATION, Bakalar Air Force Base, ENG-11-032-61-60. $250,000. CD 3/6/61.

BUILDINGS—BA

▲ **Mich., Detroit**—BA 4/4—Bd. Educ., 1354 Broadway, Zone 26, SCHOOL, 11600 East 7-Mile Rd. $2,000,000-$3,000,000. Plans deposit $25. Smith Hinchman & Grylls, 3107 W. Grand Blvd., Zone 2, archts. CD 9/29/60.

† **Ill., Aurora**—BA About 4/11—U. S. Eng., 536 S. Clark St., Chicago, Zone 5, 2 story, 13,900 sq. ft. ARMORY, 1 story, 2,540 sq. ft. MAINTENANCE SHOP, ENG-11-036-61-70. $400,000. CD 6/14/60.

† **Ill., Champaign**—BA About 4/11—U. S. Eng., 536 S. Clark St., Chicago, Zone 5, 2 story, 13,900 sq. ft. ARMORY, 1 story, 2,540 sq. ft. MAINTENANCE SHOP, ENG-11-036-61-70. $400,000. CD 6/13/60.

† **Ind., Bloomington**—BA About 4/11—U. S. Eng., 536 S. Clark St., Chicago 5, Ill., 2 story, 13,900 sq. ft. ARMORY, 1 story, 2,540 sq. ft. MAINTENANCE SHOP, ENG-11-036-61-70. $400,000. CD 6/16/60.

† **Ind., Rushville**—BA About 4/13—U. S. Eng., 536 S. Clark St., Chicago 5, Ill., U. S. ARMY RESERVE CENTER, 1 story, approx. 4,500 sq. ft., masonry bldg., 1 story, approx. 1,300 sq. ft. MAINTENANCE SHOP, ENG-11-032-61-71. $200,000.

HEAVY CONSTRUCTION—LB & CA

▲ **Lamm Constr. Co.**, Litchfield, Mich., LB **$158,765**, Contr. 4, Market St. INTERCEPTING SEWER; LB **$257,477**, Contr. 5, Big Squaw Creek INTERCEPTING SEWERAGE SYSTEM, GIRARD, O. City, City Hall, Girard, O. BA 3/6/61, CD 2/1/61;
Pitt Constr. Co., 1235 Washington Blvd., Pittsburgh, Pa., LB **$772,340**, Contr. 2, SEWAGE TREATMENT PLANT, (Girard, O.);
Soda & Luscher Constr. Co., 1345 Warren Ave., Niles, O., LB **$248,362**, Contr. 6, Little Squaw Creek INTERCEPTING SEWERAGE SYSTEM, (Girard, O.).

Price Bros., 1932 East Monument Ave., Dayton, O., LB **$190,103**, furnish 7,200 ft. 30 in. and 6,300 ft. 24 in. WATER LINES for Heather Downs Blvd. and Brookford Dr. Project, TOLEDO, O. City, City Hall, Toledo, O. BA 3/7/61. CD 2/21/61;
Leon Boulton & Son, Inc., 3935 Westland, Toledo, O., LB **$150,766**, est. $170,000, (10 bidders) install WATER LINES in Brookford Dr. Heather Downs Blvd. area, (Toledo, O).

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield, Bids opened 3/10, ROADS,

Ill.—**Peter Kiewit Sons Co.**, 257 E. 147th St., Harvey, Ill., LB **$2,470,484**, (6 bidders), dual paving 5.66 mi. FAI 74 and Frontage Rd. southwest of Colona at two locations Rock Island and Henry Counties; LB **$2,039,123**, (9 bidders), dual paving 5.23 mi. FAI 80, four ramps at interchange with Ill. 82 southwest of Geneseo, Henry Co.; LB **$1,586,294**, (8 bidders), dual paving, 2.44 mi. FAI 74 and 80, eight ramps west of Geneseo, Henry Co.; LB **$1,613,379**, (13 bidders), dual paving 3.74 mi. FAI 80 near Geneseo, Henry Co.;

Ill.—**W. J. Sheppard Co.**, 1412 Atlgeld St., Chicago, Ill., LB **$161,864**, (7 bidders), resurf. 0.69 mi. Sibley Blvd. and Torrence Ave., Calumet City, Cook Co., LB **$179,520**, (3 bidders), surf. course 4.17 mi. FAS 90 northeast of Oregon, Ogle Co.;

Ill.—**Robert R. Anderson Co.**, 4550 W. Patterson Ave., Chicago, Ill., LB **$609,222**, (12 bidders), resurf. 0.76 mi. Cermak Rd., Westchester, Cook Co.;

Ill.—**Cataphote Corp.**, 2505 Albion St., Toledo, O., LB **$192,903**, (2 bidders), pavement marking 101 mi., Statewide.;

Ill.—**Dale Denny Constr. Co.**, Anna, Ill., LB **$245,660**, (3 bidders), bit. surf. 4.43 mi. FAS 949 near Miller City, Alexander Co.;

Ill.—**Franklin Asphalt Co.**, Carbondale, Ill., LB **$136,189**, (4 bidders), surf. treatment 42 mi. Ill. 127, Ill. 169, FAS 932, Dist. 9;

Ill.—**Giertz-Melahn**, 57 Douglas Ave., Elgin, Ill., LB **$96,886**, (4 bidders), resurf. 7.24 mi. Ill. 76 from intersection with 173 to Belvidere, Boone Co.;

Ill.—**Herrin Advertising Co.**, Jacksonville, Ill., LB **$107,090**, (6 bidders), furnish, erect traffic signs and delineators 35.72 mi. FAI 80 from Ottawa to Joliet, LaSalle, Grundy, Kendall and Will Counties;

Ill.—**J. P. Hollerich**, P. O. Box 214, LaSalle Co., Ill. LB **$109,761**, (7 bidders), resurf. 10.71 mi. Ill. 89 Lamoille to Ladd, Bureau Co.;

Ill.—**McDougal-Hartmann Co.**, 3101 N. Adams St., Peoria, Ill., LB **$2,439,728**, (5 bidders), dual concrete paving 6.74 mi. FAI 74 from Morton easterly to Deer Creek, Tazewell Co.;

Ill.—**Ninora Constr. Co.**, P. O. Box 892, Joliet, Ill., LB **$323,888**, (7 bidders), resurf. 29.7 mi. Ill.

142 between Broughton and Wayne City, Hamilton and Wayne Counties;

Ill.—**Parro Constr. Co.**, 703 E. University St., Urbana, Ill., LB **$138,733**, (5 bidders), resurf. 5.15 mi. US 150 from east of Paris to state line, Edgar Co.;

Ill.—**Rein, Schultz & Dahl, Inc.**, RR 2, Madison, Wis. LB **$147,465**, (5 bidders), resurf. 10.59 mi. US 20, Stockton to Elizabeth, Jo Daviess Co.;

Ill.—**Rock Road Constr. Co.**, 5915 Rodgers Ave., Chicago, Ill., LB **$1,292,411**, (8 bidders), paving 1.13 mi. FAI 90 in Elmhurst and North Lake, incl. paved ramps at three interchanges, Cook and DuPage Counties;

Ill.—**Sjostrom Paving Co.**, 1718 7th Ave., Rockford, Ill., LB **$814,795**, (3 bidders), dual paving 1.37 mi. Rockford by-pass FA 194, Winnebago Co.;

Ill.—**Zimmerly Constr. Co.**, 1604 S. Marshall St., Paris, Ill., LB **$116,039**, (4 bidders), base course widening 5.15 mi. SBI 134 (US 159) from east of Paris to state line, Edgar Co. CD 2/27/61.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div Hys., Centennial Bldgs., Springfield, Bids opened 3/10, BRIDGES,

Ill.—**American Bridge Div., US Steel**, 208 S. LaSalle St., Chicago, Ill., LB **$112,477**, (5 bidders), steel for two parallel grade separation at interchange of FAI 74 and 80 west of Geneseo, Henry Co.;

Ill.—**Robert R. Anderson Co.**, 4550 W. Patterson St., Chicago, Ill., LB **$273,577**, (6 bidders), grade separation Western Ave. over No. 111, Tollway in Hazelcrest, Cook Co.;

Ill.—**Belvidere Constr. Co.**, Allason Bldg., Belvidere, Ill. LB **$146,131**, (10 bidders), two dual bridges, FAI 74, southwest of Colona, Henry Co.;

Ill.—**Bert Chamness Constr. Co.**, 214 Washington St., Carterville, Ill., LB **$289,191**, (16 bidders), grade separation twp. road over FAI 55 north of Springfield and earth grading, Sangamon Co.;

Ill.—**Chicago Heights Steel Co.**, 1632 Wentworth Ave., Chicago Heights, Ill., LB **$169,499**, (9 bidders), furnish steel for grade separation Cermak Rd. over IHB RR and 25th Ave., on Ill. 55 in Westchester and Broadview, Cook Co.;

Ill.—**Chism, Inc.**, Box 1238 Springfield, Ill., LB **$159,314**, (9 bidders), two grade separation structures Hazel Dell Rd. over US 66 south of Springfield Sangamon Co.;

Ill.—**Culberson Constr. Co.**, Pana, Ill., LB **$299,396**, (12 bidders), two grade separations structures FAI 55 over IC RR 1 mi. east of Springfield, Sangamon Co.;

Ill.—**Herlihy Mid-Continent Co.**, Rm. 1005, 407 S. Dearborn St., Chicago, Ill., LB **$542,947**, (8 bidders), grade separation 59th St. over South Expressway, Chicago, Cook Co.;

Ill.—**Joliet Bridge & Constr. Co.**, 68 N. Chicago St., Joliet, Ill., LB **$174,417**, (11 bidders), two grade separation structures FAI 80 over SA 9 southeast of Colona, Henry Co.;

Ill.—**Kenny Constr. Co.**, 3220 Oakton St., Skokie, Ill., LB **$876,092**, (11 bidders), grade separation York Rd. over Roosevelt Rd. on FAS 1135 south of Elmhurst, DuPage Co.;

Ill.—**McDouglas-Hartman Co.**, 3101 N. Adams St., Peoria, Ill., LB **$362,091**, (7 bidders) four grade separation structures US 150 east of Lake Peoria, Tazewell Co.;

Ill.—**Schmidt Constr. Co.**, Winfield, Iowa LB **$262,847**, (13 bidders), two parallel grade separation at interchange of FAI 74 and 80 west of Geneseo, Henry Co.;

Ill.—**Shappert Engineering Co.**, Blaine St., Belvidere Ill., LB **$114,773**, (11 bidders), grade separation structure SA 16 over FAI 80 southwest of Geneseo, Henry Co.;

Ill.—**Superior Concrete Constr. Co.**, 6949 S. Bennett Ave Chicago 45, Ill., LB **$645,832** (12 bidders), grade separation Cermak Rd. over IHB RR and 25th Ave. on Ill. 55 Westchester and Broadview, Cook Co.;

Ill.—**A. J. Walker Constr. Co.**, 421 S. 21st St., Mattoon, Ill., LB **$122,689**, (13 bidders) bridge over Salt Creek south of DeWitt on FAS 1489, DeWitt Co. CD 2/23/61.

ILLINOIS—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield, ROAD,
received no bids Mar. 10, widening, resurf. Ill. 3 between Grimsby and Cora, Jackson Co. CD 2/27/61.

S. G. Hayes & Co., 16200 S. Claremont Ave., Markham, Ill., LB **$275,062, est. $350,000**, Bit. ROAD SURF., COUNTRY CLUB HILLS, (HOMEWOOD P. O.) ILL. Village, Village Hall, Homewood P.O., 17701 Crawford Ave., Country Club Hills, Ill. BA 2/20/61. CD 2/3/61.

Acton Constr. Co., 1871 County Rd. Co., St. Paul, Minn., LB **$264,283**, (5 bidders), WATER PUMP STATION and WELL, Div. B, EAST MOLINE, ILL. City, City Hall, East Moline, Ill. BA 3/6/61, CD 2/21/61;
Normoyle & Berg, 2223 11th St., Rock Island, Ill., LB **$141,264**, (7 bidders), WATER MAINS, Div. A, (East Moline, Ill.)

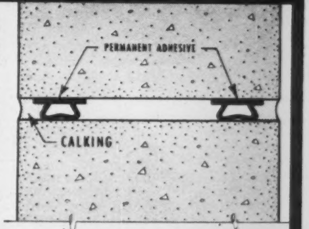
Santucci Constr. Co., 5115 Church St., Skokie, Ill., LB **$377,965**, (8 bidders), SEWER, Mason Branch Dist., SPRINGFIELD, ILL. City, City Hall, Springfield, Ill. Charles Nelson, c/o owner, city engr. BA 3/7/61. CD 4/26/56.

Milwaukee Underground Constr. Co., 6227 W. Greenfield Ave., Milwaukee, Wis., LB **$293,504**, (3 bidders), SANITARY SEWERAGE SYS., Proj. SS-2A-60, BROOKFIELD, WIS. City, City Hall, Brookfield, Wis., BA 3/6/61, CD 2/8/61;
Rock Contractors, 9121 W. Lisbon Ave., Milwaukee, Wis., LB **$269,009**, (4 bidders), SANITARY SEWERAGE SYS., Proj. SS-2B-60, (Brookfield, Wis.);

E. D. Wesley Co., 706 East Lincoln Ave., Milwaukee, Wis., LB **$444,443**, YARD PIPING, Howard Ave. Purification Plant, MILWAUKEE, WIS. City, City Hall, Milwaukee, Wis. BA 3/7/61. CD 2/14/61.

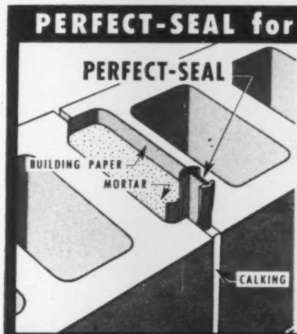
RUBBER or VINYL
SEALS and GASKETS
for PRECAST CONCRETE PANELS

Williams Panel Seals (Pats. Pend.) were developed especially for use in vertical and horizontal joints of precast concrete wall panels . . . they are extrusions of expanded, closed-cell Neoprene Rubber. This closed-cell material, and the hollow-core design, provide the properties which assure a positive pressure-contact seal in panel joints under all conditions—each type of seal readily compensates for variations in joint width, irregular joint surfaces and erection adjustments.



VERTICAL JOINT
6" Precast Concrete Panel

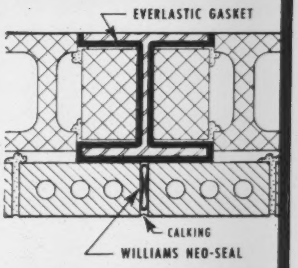
PERFECT-SEAL for CONTROL JOINTS



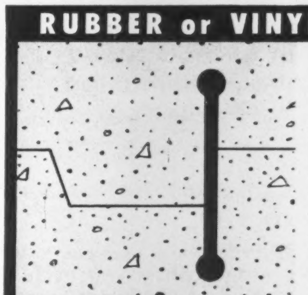
Williams "Perfect-Seal" (Pat. Pend.) is a specially designed seal for use in Mortar-Keyed Control Joints . . . it provides continuous four-point pressure-contact sealing which keeps moisture out of joints and prevents air passage. The T-Section is a high-grade rubber compound; the cross-sealing member at the base of the "T" is a strip of readily compressible, non-absorbent, expanded closed-cell Neoprene Rubber—it provides an effective pressure-contact seal directly behind the calking.

EVERLASTIC MASONRY GASKETS

Everlastic Masonry Gaskets are a readily compressible, nonabsorbent Elastomer which is impervious to water and inert to heat, cold and acids. In masonry joints, they permit linear expansion, and seal the joints against moisture penetration which causes frost damage. Everlastic Gaskets should be used between sill and coping stones, stone or prefab metal wall panels, and to isolate and cushion all steel or concrete columns to permit normal movement without damage to masonry walls.



RUBBER or VINYL WATERSTOPS



Williams Waterstops are made from Natural Rubber Stock and designed for maximum effectiveness in any type of cast-in-place construction joint. They will bend around corners, and will not crack or tear from shear action. Tensile Test: 3990 lbs., Elongation Test: 650%. Available in rolls up to 80 feet in length. Molded union and junction fittings available. Williams Waterstops can be furnished in Vinyl or Neoprene for industrial uses where resistance to oil or other injurious wastes is desirable.

See Sweet's Files, or Write for Information.

WILLIAMS
EQUIPMENT and SUPPLY CO.
486 W. Eight Mile Rd., Hazel Park, Michigan

▲ **MICHIGAN**—State Hy. Dpt., 732 Mason Bldg., Lansing, 26, ROADS,

Mich. — **L. W. Edison Co.**, 3134 Midland Dr. S.E., Grand Rapids, Mich., CA **$2,540,947**, grading, drainage, structures 5.811 mi. US 16 relocation from Meridian Rd. East to Meech Rd., Ingham Co.; CA **$2,914,588**, grading, drainage, structures dual 24 ft concrete pavt., 7 bridges, 5.78 mi. US 16 relocation from Meech Rd. East to Ingham-Livingston County Line, Ingham Co.;

Mich.—**Cooke Constr. Co.**, 1116 Penobscot Bldg., Detroit, Mich., CA **$3,301,111**, grading, drainage structures, 7 bridges 7.86 mi. US 16 relocation from M-59 west to Ingham-Livingston County Line, Livingston Co.; CA **$2,871,402**, grading, drainage structures, 4 bridges 3.123 mi. I 75 from C & O RR east of Holly Rd. north and west to point east of Fenton Rd., Genesee Co.;

Mich.—**Holloway Constr. Co.**, 29350 Joy Rd., Livonia, Mich., CA **$2,199,990**, grading, drainage structures 2 bridges 7.942 mi. US 27 relocation from Wolverine north to proposed M-68, Cheyboygan Co.; CA **$3,663,099** grading, drainage structures, 6 bridges 10.55 mi. I 75 from Vanderbilt northeast to Wolverine, Cheboygan and Otsego Counties;

Mich.—**Cooke Contg. Co.**, 1116 Penobscot Bldg., Detroit, Mich., **Charles J. Rogers**, 14836 Grand River, Detroit, Mich., and **Jutton-Kelly Co.**, 13240 Alber, Dearborn Mich., CA **$2,411,015**, grading, drainage structures 3 bridges, 3.996 mi. US 10 from C. & O. R.R. in County south to Evans Rd. in Oakland Co., Genesee and Oakland Counties; CA **$763,993**, detour constr. and structure work I 75 Walter P. Chrysler Expressway at Jefferson and Hastings, Wayne Co.;

Mich.—**Eisenhour Constr. Co., Inc.**, P. O. Box 486, East Lansing Mich. and **Mid-America Engr. Corp.**, 1926 Lake Shore Dr., Muskegon, Mich., CA **$674,113** grading, drainage structures 12.659 mi. US 31 from south limits of Bear Lake in Manistee county north to Jct. with M-115 in Benzie Co., Manistee and Benzie Counties;

Mich.—**Walton Constr. Co.**, Kingsley, Mich., CA **$594,035**, grading, drainage structures 7.104 mi. M 72 from Grand Traverse-Kalkaska County easterly, Kalkaska Co.;

Mich.—**Louis Garavaglia Contractors**, 24240 Lund Rd., Warren, Mich., CA **$4,253,698**, grading, drainage, retaining walls, approach paving, alterations to sewer, water, electric sys. 1.41 mi. John C. Dodge Extension from Meyers Rd. to 7-Mile Rd., Detroit, Wayne, Co. BA 2/22 CA 3/7 Grand Ttoal $26,187,991. CD 3/9/61, under LB.

MICHIGAN—State Hy. Dpt., 732 Mason Bldg., Lansing, ROAD,

Proksch Constr. Co., Iron River, Mich., CA **$673,057** aggreg. base course 10.642 mi. M 35 from 9 mi. south of Menominee-Delta County line northeast to existing concrete pavt. in Delta Co., Delta and Menominee Counties. BA **2/15**, CA **3/7**. CD **3/7/61**. under LB.

Sudgen, Inc., 13100 Cloverdale Ave., Oak Park, Mich., LB **$280,626**, (18 bidders), enclosure 4,500 lin. ft. 84 in. OPEN DRAIN CANAL, 9-Mile Rd. to Audrey and Topefer Sts. southwest section, WARREN, MICH. City, 29500 Van Dyke Ave., Warren, Mich. Johnson & Anderson, Inc., 2300 Dixie Hy., Pontiac, Mich. engr.

BUILDINGS—LB & CA

deHamel Constr. Co., 3713 Lee Rd., Cleveland 20, O., CA Est. **$250,000, (8 bidders)**, PLANT, Richmond Rd., BEACHWOOD, O. Gilmore Industries, Inc., 13015 Woodland Ave., Cleveland 20, O. BA 3/2/61, CA 3/6/61. CD 2/27/61.

▲ **Johnson, Drake & Piper**, 112 N. 7th St., Terre Haute, Ind., LB government maintenance for POST OFFICE ANNEX, CINCINNATI, O. U. S., Post Office Dpt., Pennsylvania Ave. between 12th and 13th Sts. N. W., Wash., D. C., BA 3/10/61, CD 3/1/61;
Thomas D. and Elizabeth K. McCloskey, 1620 W. Thompson St., Phila., Pa., LB lessor maintenance for POST OFFICE ANNEX, (Cincinnati, O.) est. **$9,000,000,**

C. C. **Vogel**, 1891 Frebis Ave., Columbus, CA **$940,000**, general contract St. Francis de Sales HIGH SCHOOL, Karl and Ferris Rd., north Columbus, COLUMBUS, O. Diocese of Columbus, 198 Broad St., Columbus, O. CA 3/10/61. CD 3/17/60.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

▲ **Colo., Colorado Springs**—BA 3/29—Air Force Academy Foundation, First National Bank Bldg., (selected list of bidders), rein.-con. STADIUM, Air Force Academy. $2,000,000. Extended date. Praeger, Kavanagh, Waterbury, 126 E. 38th St., New York City, N. Y., archts. and engrs. Gordon Sweet, 222 E. Bijou St., assocs. archt. Joseph F. Jelley, 131 E. Vermijo Ave., engr. CD 12/15/60.

Neb., Omaha—BA 3/29—Coe J. Peppers, clk., Sanitary & Imprvt. Dist. No. 51, 4660 South 60th Ave., 23,765 sq. yd. 8 in. concrete PAVING with 6 in. integral curb, plus storm sewer, headers, etc. $187,487. Gollehon & Schemmer, Inc., 4660 South 60th Ave., Zone 17, engr.

† **S. D., Yankton**—BA 3/29—Fish & Wildlife Service, Dpt. Interior, 1006 W. Lake St., Minneapolis 8, Minn. GRADING ACCESS ROAD and PARKING AREAS, etc., Gavins Point National Fish Hatchery. CD 8/11/60.

† **S. D., Pickstown**—BA 3/31—U. S. Eng., 215 N.17th St., Omaha, Zone 2, erection three RADAR TOWERS, incl. interior heating and electrical facilities, Pickstown Air Force Base, ENG-25-066-61-135, $200,000. Plans deposit $6.10. CD 5/15/59.

† **Wyoming**—BA 4/6—Bureau Reclamation, Dpt. Interior, Casper, SURFACING Leo-Kortes and Leo-Seminoe Access Roads, Missouri River Basin Project, near Casper, Spec. No. DC-5543. CD 5/25/44.

▲† **Tex., San Antonio**—BA 4/20—U. S. Eng., P.O. Box 1129, Galveston, U. S. Air Force SCHOOL OF AVIATION MEDICINE, Phase II, ENG-41-243-61-18B. $8,000,000. Plans deposit $10. CD 3/8/61.

▲† **Colo., Colorado Springs**—BA On Or About 4/25—U. S. Eng., U. S. Post Office & Courthouse, Omaha 2, Neb., NORAD EXCAVATION, rock excavation for access and exhaust tunnels, chambers and reservoirs, wire mesh reinforcement, rock bolts, struct. steel tunnel supoort, conc. tunnel lining, utility entrances, maintenance and repair approx. 5 mi. existing access road, incl. installation hy. guardrail, clearing, grubbing, slope treatment and temporary surface drainage at each rein.-con. portal, ENG-25-066-61-41. $7,500,000. CD 9/25/59.

† **Mont., Glasgow**—BA 4/26—U. S. Eng., 1519 S. Alaskan Way, Seattle 4, Wash., 4,000 sq. ft. masonry CHAPEL ADDN., Glasgow Air Force Base, ENG-45-108-61-139. $200,000. Plans deposit $2.30. CD 7/27/60.

▲† **Kan., Kansas City**—BA 4/27—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., Kansas City Terminal R.R. BRIDGE over Kansas River, CIVENG-23-028-61-68. $3,000,000. Plans deposit $10. Sverdrup & Parcel, 915 Olive St., St. Louis, Mo., engrs. CD 3/10/61.

BUILDINGS—BA

† **Colo., Denver**—BA 3/22—U. S. Eng., 215 N. 17th, Omaha 2, Neb., FUEL STORAGE FACILITY, Rocky Mountain Arsenal, ENG-250066-61-127, $400,000. Plans deposit $2. CD 3/8/61.

▲ **Kan., Mission** — BA 3/30 — Shawnee-Mission High School Dist., 7401 Johnson Dr., Shawnee-Mission, 1, 2 & 3 story, rein.-con., frame, structural steel Shawnee-Mission West HIGH SCHOOL, Overland Park. $4,000,000. Plans deposit $100. Marshall & Brown, 1016 Baltimore, Kansas City, Mo., archts.

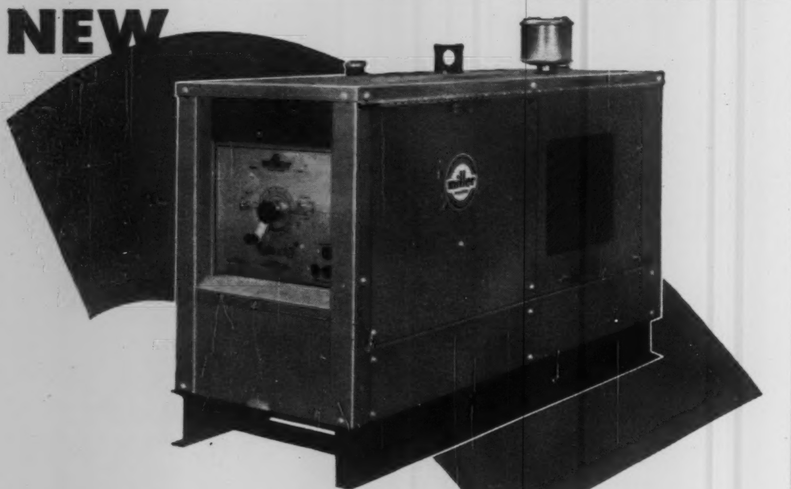
Ark., West Memphis—BA 4/5—West Memphis Housing Auth., West Memphis, 119 low-rent HOUSING. $900,000. Stuck, Frier, Lane & Scott, Rowton Bldg., archts. CD 2/16/61.

▲† **S. D., Rapid City**—BA On Or About 4/12—Base Procurement Office, Ellsworth Air Force Base, completion of constr. Armed Services HOUSING PROJ., 220 family housing units, Ellsworth Air Force Base, IFB-39-601-61-60.

BUILDINGS—SLC

▲ **Mo., Kansas City**—Business Men's Assurance Co., 215 W. Pershing Rd., soon lets contract 19 story OFFICE,

(Continued on page 208)



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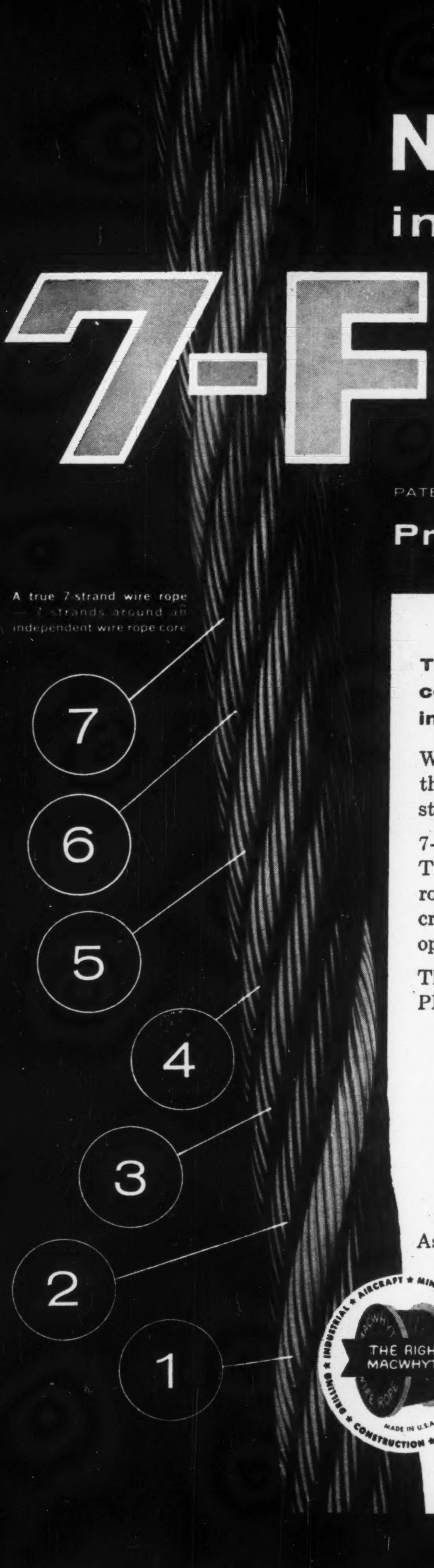
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Wire Rope Manufacturing Specialists Since 1896

CIRCLE 207 ON READER SERVICE CARD

(Continued from page 206)

northeast corner Southwest Trafficway and 31 St. $7,000,000. Skidmore, Owings & Merrill, 30 W. Monroe, Chicago, Ill., archts. Black & Veatch, 1500 Meadow Lake Parkway, Box 8405, Kansas City 14, Mo., engrs. CD 4/20/60.

HEAVY CONSTRUCTION—LB & CA

E. A. **Carlstrom Constr. Co.**, Mankato, Minn., LB **$413,785**, (2 bidders), STADIUM and PLAYFIELDS, Mankato State College, MANKATO, MINN. State Dpt. Admin., 19 State Capitol, St. Paul, Minn. BA 3/9. CD 2/27/61.

▲† **Hoak Constr. Co.**, 1040 Hoak Dr., Des Moines, Iowa, CA **$3,335,243**, 200 mi. TRANSMISSION LINES between Sioux City and Spencer and from Sioux City to Creston by way of Denison, part of Missouri River Basin Project Transmission Div., Spec. DC 5457, IOWA. Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver, Colo. BA 2/21/61. CD 2/24/61, under LB.

† **Massman Constr. Co.**, 3917 Broadway, Kansas City, Mo., LB **$558,200**, est. $562,823, (3 bidders), TIMBER PILING, clump dikes and stone fill dikes, Mississippi River between approx. river miles 119.8 to 152.5 above mouth of Ohio River, Ste. Genevieve and Jefferson Counties, Mo. and Randolph and Monroe Counties, Ill., CIVENG-23-065-61-49, MISSOURI and ILLINOIS. U. S. Eng., 420 Locust St., St. Louis 2, Mo. BA 3/2. CD 1/26/61.

▲ **SOUTH DAKOTA**—State Hy. Dpt., Hy. Bldg., Pierre, ROADS, Bids opened 3/7,

S. D.—**A. W. Schnuerle**, Aberdeen, S. D., LB **$166,148**, (20 bidders), base course and bit. surf., 12.043 mi. from N. of Grann Valley South, F 043-3(3) and F-043-2(3), Buffalo and Brule Counties; LB **$189,674**, (9 bidders), grading, and emulsified asph. surf. from Keyapaha north and East, S 6770(2), Tripp Co., LB **$381,794**, (15 bidders), grading, service gravel and two rein.-con. box culverts, 20.77 mi., Onaka to SD 45, F 042-2(5), Faulk Co.; LB **$122,109**, (17 bidders), grading, 9.906 mi. SD 20, from Northville west., F 042-2(4) and F 042-3(5), Faulk and Spink Counties;

S. D.—**Western Cont. Corp.**, 400 Benson Bldg., Sioux City 16, Iowa, LB **$4,543,033**, (5 bidders), concrete pavement 15.039 mi. I 29 Iowa Line to Elk Point, I 29-1(10)0, Union Co.;

S. D.—**J. L. Healy Constr. Co.**, 3814 W. 14th. St., Sioux Falls, S. D., LB **$106,617**, (13 bidders), grading 7.581 mi. Nunda South and E., S 3300(3) and S 3310(1), and Spur, Lake Co.;

S. D.—**Larson & Teigen, Inc.**, Aberdeen, S. D. LB **$329,495**, (4 bidders) grading, curb and gutter and surf., from I 29 to US 77, S 7592 and F 003-2, Lincoln Co.;

S. D.—**G. H. Lindekugel & Sons, Inc.**, Airbase, Mitchell, S. D. LB **$155,278**, (15 bidders), grading, 9.929 mi. SD 44 from US 281 East, S 1971(7), Douglas Co. CD 2/16/61.

▲† **Phillips & Davis, Inc.**, P.O. Box 231, Kenton, O., CA **$1,962,884**, DRAFT TUBES and intake gates and bulkheads, Big Bend Reservoir, Fort Thompson, ENG-25-066-61-73, SOUTH DAKOTA. U. S. Eng., 215 N. 17th. St., Omaha 2, Neb. BA 2/24/61. CD 2/28/61, under LB.

† **Bureau Reclamation, Dpt. Interior**, Bldg. 1A, Denver Federal Center, Denver, Colo., rejected bids Feb. 16, Missouri River Basin Proj., initial CLEARING of Red Willow Reservoir, No. 701C-438, NEBRASKA. CD 2/1/61.

Consumers Public Power Dist., District's General Office, 14th and O Sts., Lincoln 1, Neb., cancelled bids to have been opened Mar. 21, MASONRY, CEMENT and DUCT WORK, at 17th and Prospect, Contr. E61-7, NEBRASKA. Will re-advertise. CD 3/8/61.

▲† **Nolan Brothers, Inc.**, Box 218, Wichita Falls, Tex., CA **$6,642,236**, SPILLWAY and COMPLETION EMBANKMENT, John Redmond Dam and Reservoir, Grand (Neosho) River, ENG-34-066-61-53, KANSAS. U. S. Eng., P.O. Box 61, Tulsa 2, Okla. BA 2/24. CD 3/8/61, under LB.

Tri-City Constr. Co., 3001 East 83rd St., Kansas City, Mo., LB **$226,289**, est. $288,488, (9 bidders), two SEWAGE PUMPING STATIONS, 33,600 lin. ft. 8- to 12-in. sewers, stabilization pond, etc., SPRING HILL, KAN. City, City Hall, Spring Hill, Kan. BA 2/27/61.

† **Belco, Inc.**, 215 First National Bank Bldg., Norman, Okla., CA **$524,763**, MODIFYING BUILDINGS AREA D, Tinker Air Force Base, IFB-34-601-61-243B(PL), OKLAHOMA CITY, OKLA. Procurement Div., Headquarters Oklahoma City, Air Materiel Area, Tinker Air Force Base, Oklahoma City, Okla. BA 2/16/61. CD 2/6/61.

COLORADO—State Hy. Dpt., 4201 East Arkansas, Denver, ROADS.

Domenic Leone Constr. Co., Inc., 818 S. Oak St., Trinidad, Colo., CA **$311,601**, est. $304,000, grading, structures and plant mixed asphaltic surfacing, approx. 9.441 mi. Proj. No. S 0023(9), Lincoln Co. BA 3/3/61, CA 3/3/61. CD 2/15/61.

COLORADO—State Hy. Dpt., 4201 East Arkansas, ROADS,

Colo.—**Dominic Leone Constr. Co.**, 818 Oak St., Trinidad, Colo., CA **$199,981**, est. $190,000, (9 bidders), grading, structures, asphaltic stabilization and surfacing, approx. 4.451 mi., Proj. No. F 017-2(6) El Paso Co.;

Colo.—**L. H. Kilgroe**, 7991 West 6th Ave., Denver, Colo. CA **$214,654**, est. $218,000 (9 bidders), grad-

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CIRCLE 55 ON READER SERVICE CARD

ing, structures, plant mixed asphaltic surfacing, approx. 0.868 mi. Proj. No. C 11-0121-26, Jefferson Co.;

Colo.—**Pioneer Constr. Co.**, Rte. 2, Box 21, Pueblo, Colo., CA **$240,228**, est. $218,000, (8 bidders), stabilization, structures, plant mixed asphaltic surfacing, approx. 8.137 mi., Las Animas Co.;

Colo.—**Broderick & Gibbons**, 6th East and Santa Fe Trail, Pueblo, Colo., CA **$116,834**, est. $110,000, (5 bidders), grading, structures, stabilization, surfacing, approx. 0.838 mi. Proj. No. C 02-0096-21, Pueblo Co., Grand total $771,697, BA 3/8/61. CA 3/8/61. CD 2/21/61.

BUILDINGS—LB & CA

Cooper-Bessemer Corp., 5617 France Ave. S., Minneapolis, Minn., CA **$400,785**, DIESEL GENERATOR UNIT and AUXILIARY EQUIPMENT, ELK RIVER, MINN. Village, Village Hall, Elk River, Minn. BA 1/10. CD 1/16/61, under LB.

▲ **M. A. Mortenson Constr. Co.**, 250, Fremont Ave. N., Minneapolis, Minn., LB **$1,231,600**, (7 bidders), Olson Memorial JUNIOR HIGH SCHOOL, Knox Ave. and 50 St., MINNEAPOLIS, MINN. Bd. Educ., 807 Broadway N.E., Minneapolis, Minn. BA 3/7. CD 2/9/61.

Roy Scheperle Constr. Co., 1913 West Dunklin, Jefferson City, Mo., CA **$554,000**, (4 bidders), 20,000 sq. ft. TELEPHONE BLDG., incl. air-conditioning, JEFFERSON CITY, MO. Capital City Telephone Co., 319 Madison, Jefferson City, Mo. John D. Paulus, 2118 Forest Dr., Jefferson City, Mo., archt. BA 2/2/61. CA 3/1/61.

▲ **Allen Bros. & O'Hara Constr. Co.**, 3742 Lamar Ave., Memphis, Tenn., CA **$2,000,000**, 5 story T-shaped 56 x 250 ft. and 58 x 86 ft. MOTEL, parking below ground, swimming pool, KANSAS CITY, MO. Downtowner Motor Inn, c/o Lyle E. Dutoit, 4900 Lister, Kansas City, Mo. George A. Thomason, 2158 Union Ave., Memphis, Tenn., archt.

▲ **J. E. Dunn Constr. Co.**, 927 Holmes St., Kansas City, Mo., CA **$1,360,000**, 3 story, 65,000 sq. ft. cut stone and precast concrete DOCTORS OFFICE, 43 and Wornall Rd., KANSAS CITY, MO. Forty-Fourth & Wornall Corp., c/o Neville, Sharp & Simon, archts., 25 E. 12 St., Kansas City, Mo. BA 2/2, CA 2/22. CD 2/21/61, under LB.

J. C. Nichols, 310 Ward Parkway, Kansas City 12, Mo., Owner Builds, **$500,000**, BOWLING ALLEY, Red Bridge Shopping Center, 110 St. and Red Bridge Rd., KANSAS CITY, MO. Edward W. Tanner & Assocs., 310 Ward Parkway, Kansas City 12, Mo., archts. CD 6/28/57.

† **Veterans Admin.**, Munitions Bldg., Wash., D. C., received no bids Mar. 7, CENTRAL STERILE SUPPLY UNIT IMPRVS., Bldg. No. 1, Veterans Admin. Hospital, MUSKOGEE, OKLA. CD 2/2/61.

▲ **Gus M. and D. Cooley, Jr.**, 2026 Ward Parkway, Fort Worth Tex., **J. O. and J. Chambers**, 1519 Pennsylvania St., Fort Worth, Tex., and **L. H. and J. Stanley**, 1705 W. 2 St., Arlington, Va., LB (on Lessor maintenance) lease and bulid POST OFFICE, EL PASO, TEX. U. S. Post Office Dpt., 12th St. and Pennsylvania Ave. N.W., Wash., D. C., Est. **$2,600,000**, BA 3/8/61. CD 1/30/61.
C. H. and S. T. Leavell, 1900 Wyoming Ave., El Paso, Tex., LB (government maintenance) for lease and build POST OFFICE, (El Paso, Tex.).

Jas. A. Keller, Realtor, 206 San Francisco St., El Paso, Tex., Owner Builds, **$600,000**, SHOPPING and MEDICAL CENTER, EL PASO, TEX. CD 11/9/60.

▲ **College Park Builders**, Inc., B. F. Sturman, 11827 Durrette St., and **Jack G. Simpson**, 4809 Briarbend St., Houston, Tex., Owner Builds, **$1,100,000**, 60 DWELLINGS, in Sharpstown; **$800,000**, 50 DWELLINGS, College Park, HOUSTON, TEX.

George & McBay, Builders, c/o Lawrence D. Starnes, archt., 2214 Maroneal St., Houston, Tex., Owner Builds, **$400,000**, four 2 story, brick veneer, 58 unit APARTMENT, HOUSTON, TEX. CD 3/2/61.

▲ **J. D. Brown, Builder**, Irving, Tex., Owner Builds, **$585,000**, 45 DWELLINGS, Starlines Homes, Storey Rd., Group 1; **$742,500**, 55 dwellings, NW Sec. city, Group 2, IRVING, TEX.

McCann Constr. Co., 1813 E. Lancaster, Fort Worth, Tex. CA **$684,987**, est. $650,000, (13 bidders), two 2 story, DORMITORIES, 36 x 232 ft. conc. frame and rf., brick ext. plastered, air conditioning, S & W at Dallas University, IRVING, TEX. The University of Dallas, P O. Box 1330, Dallas, Tex. CD 1/26/61.

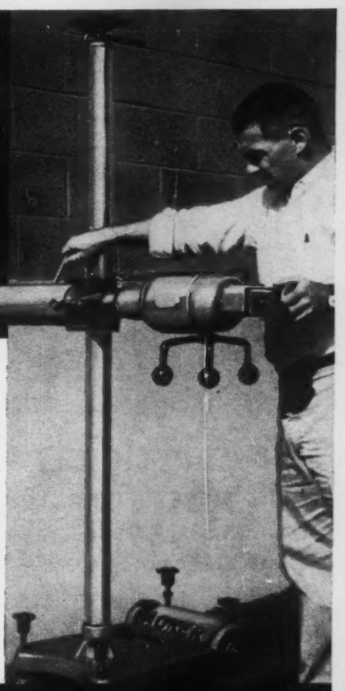
▲ **Lone Star Steel Co.**, Lone Star, Tex., Owner Builds, **$1,000,000**, ROD MILL REMODELING, IMPRVS., LONE STAR, TEX. CD 11/9/60.

▲ **Coleman Development Corp.**, 519 Mercantile Bank Bldg., Dallas, Tex., Owner Builds, **$425,000**, APARTMENT; **$675,000**, 7 unit, 80,000 sq. ft. SHOPPING CENTER, SHERMAN, TEX. Pask & Brummett, 419 Merc. Bank Bldg., Dallas, Tex., archts. CD 3/2/61.

FAR WEST

HEAVY CONSTRUCTION—BA

† **Washington**—BA 4/13—Bureau Reclamation, Dpt. Interior, East Wenatchee, EARTHWORK, PIPE LINES, and STRUCTURES, incl. pumping plants, Laterals 1 through 10 and sublaterials, East Wenatchee, Douglas Co., East Unit Greater Wenatchee Division, Chief Joseph Dam Proj., DC 5541. CD 9/16/59.



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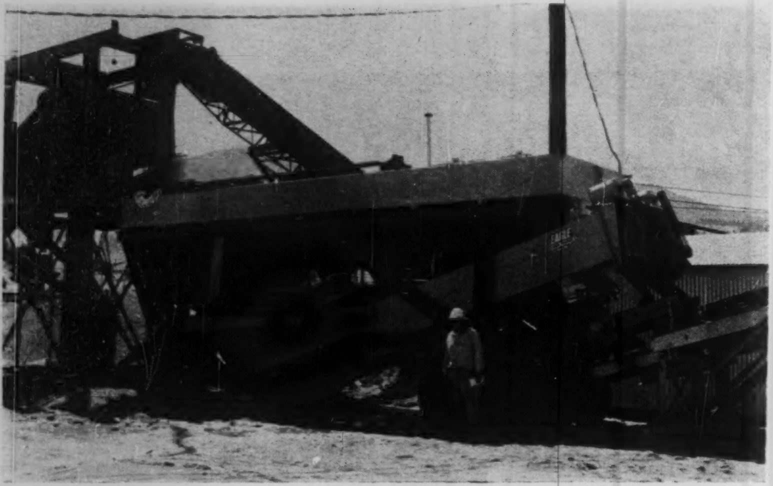

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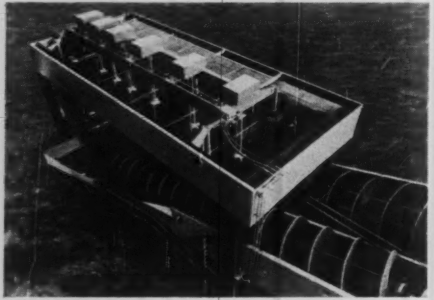

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† **California**—BA 4/20—U. S. Eng., 1209 8 St., Sacramento, BARGE CANAL, Sacramento Deep Water Channel and Sacramento River maintenance dredging, Yolo and Sacramento Counties, Spec. 2659, ENG-04-167-61-22. $800,000. Plans deposit $4. CD 10/1/59.

BUILDINGS—BA

Calif., Whittier—BA 4/5—State Div. Architecture, Rm. 9022, 107 S. Broadway, Los Angeles, 17,100 sq. ft., brick, steel frame FOOD SERVICE BLDG., Fred C. Nelles School for Boys, W.O. 4424GC-20. $625,000. Plans deposit $50. CD 5/6/60.

Calif., San Jose—BA 4/11—State Div. Architecture, 1120 N St., Sacramento, 2 and 3 story, 13,000 sq. ft. addn. and 3 story CLASSROOM, San Jose State College, W.O. 4414GC-7. $400,000. Plans deposit $25. CD 12/4/58.

▲† **Calif., Fort Ord**—BA 4/27—U. S. Eng., 180 New Montgomery St., San Francisco, 500 units CAPEHART HOUSING, Unit 4. $8,250,000. **Angus McSweeney, Inc.**, 2960 Van Ness Ave., San Francisco, archt. CD 11/15/60.

BUILDINGS—SLC

▲ **Calif., Fullerton**—St. Judes Hospital, c/o Welton Beckett & Assoc., archts., 10000 Santa Monica Blvd., Los Angeles, soon lets contract, 5 story, rein.-con. HOSPITAL addn., $1,850,000. CD 2/17/61.

HEAVY CONSTRUCTION—LB & CA

† **S. S. Mullen, Inc.**, 220 River St., Seattle, Wash., LB **$954,505**, est. $1,292,458 (11 bidders), RELOCATE ALERT HANGAR and ALERT TAXIWAY, Inv. 61-28, EIELSON AIR FORCE BASE, ALASKA. U. S. Eng., P.O. Box 7002, Anchorage, Alaska. BA 3/7. CD 2/1/61

▲† **A & B Constr. Co.**, Box 554, Helena, Mont., CA **$1,327,584**, EARTHWORK, CONCRETE LINING, STRUCTURES, Stanaker Service Canal, Central Utah Proj. Spec.5464, UTAH. Bureau Reclamation, Dpt. Interior, Bldg. 1A, Denver Federal Center, Denver, Colo. BA 2/21. CD 3/1/61, under LB.

▲ **Southern Union Gas Co. & El Paso Natural Gas Co.**, c/o El Paso Natural Gas Co. Bldg., El Paso, Tex., Owner Builds, **$2,375,000**, 60 mi. 10 in. GAS LINE, Holbrook to near Snowflake, ARIZONA.

† **Pacific Concrete Co.**, 10401 N.E. Marx St., Portland, Ore., LB **$689,333** (3 bidders), EARTHWORK, STRUCTURES for West Lateral Rehabilitation and West Lateral Extension, Talent Div., Rogue River Basin Proj., near Medford, Jackson Co., Spec. DC-5482, OREGON. Bureau Reclamation, Dpt. Interior, White City, Ore. BA 3/7/61. CD 1/11/61.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento, ROAD,

Peter Kiewit Sons' Co., 442 Post St., San Francisco, Calif., CA **$4,020,820**, 1.7 mi. eight-lane freeway on MacArthur Freeway (US Hy. 50) between 0.3 mi. west of Grand Ave. and 14 Ave., incl. six bridges, in Oakland, Alameda Co. BA 2/23, CA 3/8. CD 2/27/61, under LB.

Matt J. Zaich Co., 6828 Farmdale Ave., North Hollywood, Calif., LB **$595,662**, (6 bidders), Proj. 413, Southeast Beverly Hills STORM DRAIN, Beverly Hills, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. BA 3/3. CD 2/15/61.

† **U. S. Eng.**, 1519 S. Alaskan Way, Seattle, Wash., cancelled bids to have been opened Mar. 3, ATLAS MISSILE ASSEMBLY BLDG. and LIQUID OXYGEN PLANT ALTERATIONS, FAIRCHILD AIR FORCE BASE, SPOKANE, WASH. Will readvertise. CD 3/1/61.

† **Harbison & Mahoney**, 220 Sandburg Dr., Sacramento, Calif., LB **$326,123**, est. $352,900, (4 bidders), 10,000 sq. ft. standards calibration LABORATORY, McClellan Air Force Base, Spec. 2716, ENG-04-167-61-31, SACRAMENTO, CALIF. U. S. Eng., 1209 8 St., Sacramento, Calif. BA 3/7. CD 2/1/61.

BUILDINGS—LB & CA

Sceva Constr. Co., Inc., North 2928 Madelia, Spokane, Wash., CA Est. **$600,000**, general contract 2 story, steel frame PARISH HOUSE, SPOKANE, WASH. St. John's Episcopal Cathedral, 12th Ave. and Grand Blvd., Spokane, Wash. BA 2/21/61. CD 2/6/61.

V. Johnson & Sons, North 601 Cedar, Spokane, Wash., LB **$630,398**, (6 bidders), general contract 2 story, 48x210 ft. rein.-con. CELL BLOCK, State Penitentiary, WALLA WALLA, WASH. State Dpt. of General Admin., General Admin. Bldg., Olympia, Wash. BA 3/7/61.

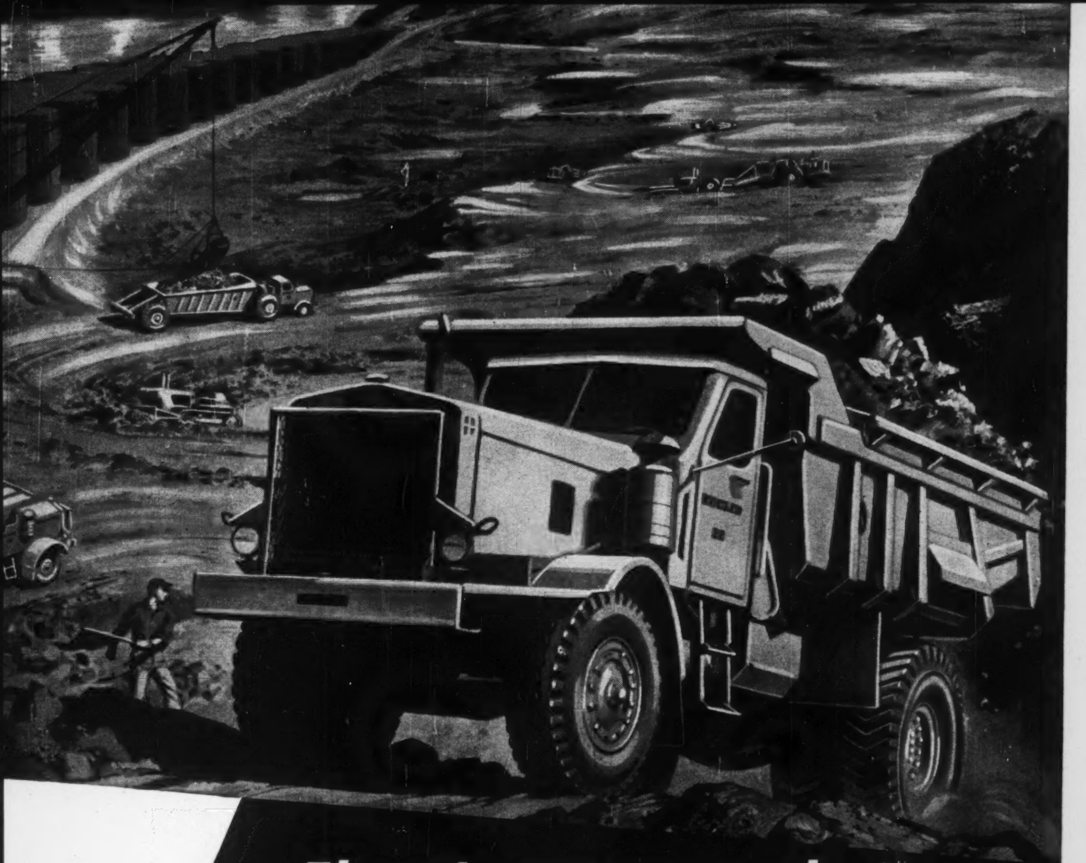
▲ **F. E. Young Constr. Co.**, 3141 Main St., San Diego, Calif., **Morrison-Knudsen, Inc.**, 411 W. 55 St., Los Angeles, Calif., and **Charles H. Tompkins Co.**, 1737 K St. N.W., Wash. 6, D. C., LB **$11,180,000**, Base Bid (6 bidders), Men's DETENTION CENTER, LOS ANGELES, CALIF. Bd. Supervs. Los Angeles Co., Hall of Records, Los Angeles, Calif. BA 3/8. CD 3/10/61, under LB.

Decatur Iron & Steel Co., Decatur, Ala., LB **$2,450,000**, PRISON EQUIPMENT for Detention Center (Los Angeles, Calif.).

E. B. Akins & Co., P.O. Box 1536, Orange, Calif., Owner Builds, **$552,000**, 46 stucco DWELLINGS, Tract 3929, ORANGE, CALIF.

▲ **John B. Clark Co.**, 17061 E. 17 St., Santa Ana, Calif., CA **$1,969,000**, 95 stucco DWELLINGS, Tract 3982, ORANGE, CALIF. **Gainsborough North Inc.**, 17061 E. 17 St., Santa Ana, Calif. **Thomas & Richardson**, 13912 Ponderosa, Santa Ana, Calif., archts.

Continued on page 214



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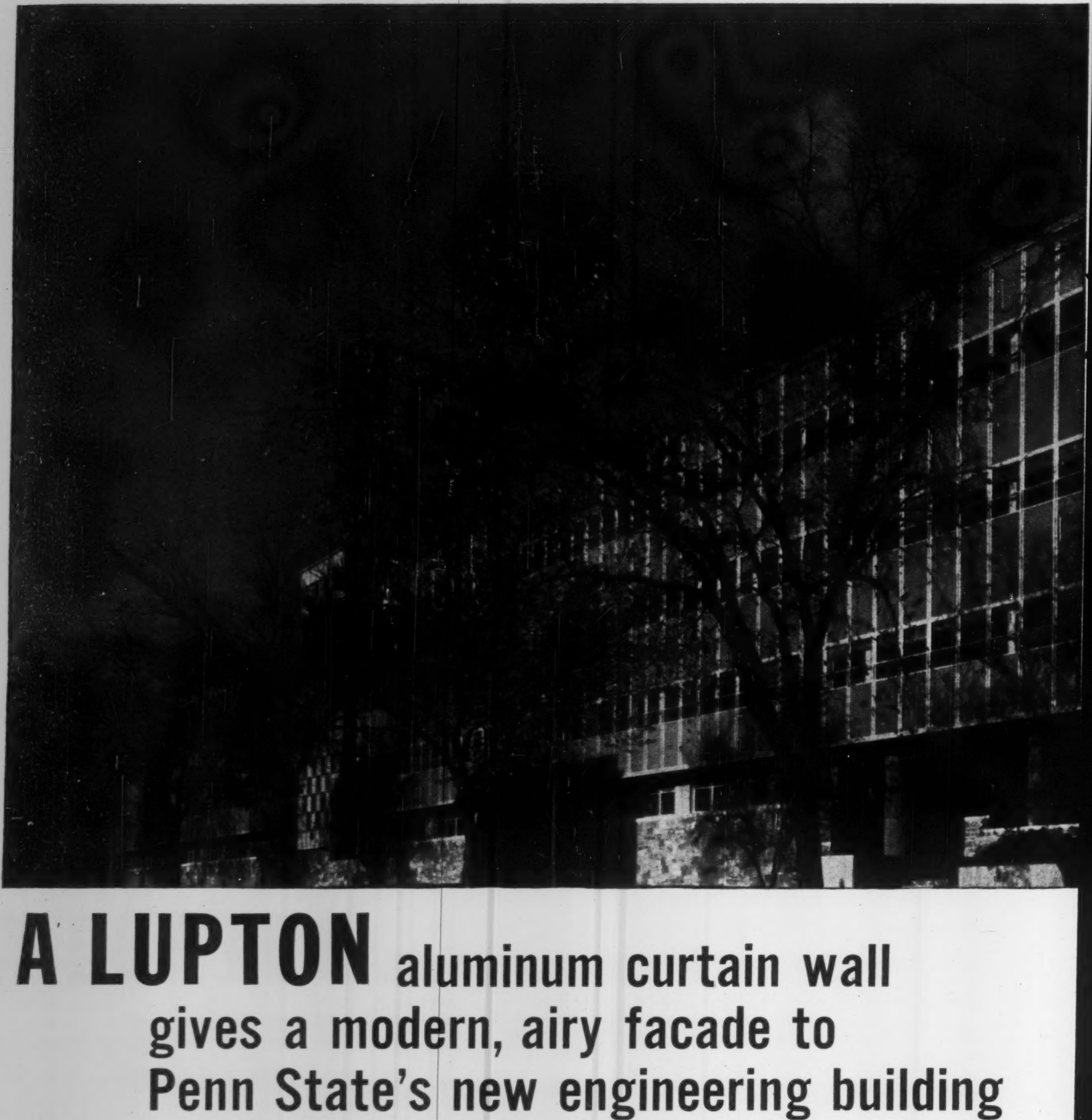

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This dynamic facade of the new Hammond Engineering Building at Pennsylvania State University proves that curtain-wall design can be free and individual. Working with standard LUPTON components, architects created a building of personality, purpose, and warm simplicity.

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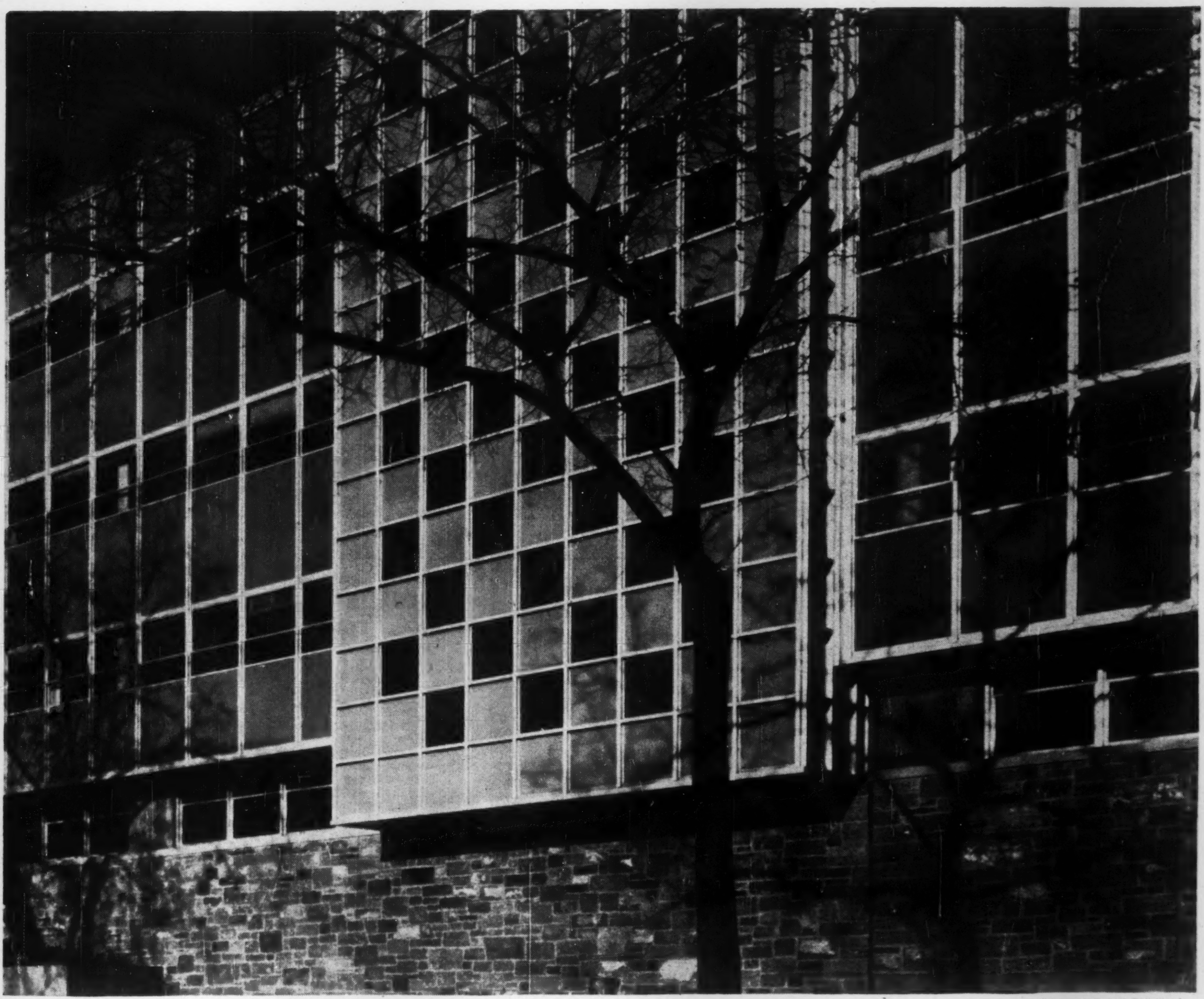
To look deeper into LUPTON advantages, see Sweet's (Sections 3 and 17) for the LUPTON Curtain Wall and Window catalogs. Then talk with your local LUPTON man, or write us for details.



Hammond Engineering Building, Pennsylvania State University, University Park, Pa. Architects and Engineers: Howell Lewis Shay & Associates, Philadelphia, Pa. Contractor: S. H. Evert Co., Inc., Bloomsburg, Pa.

Photograph by C. V. D. Hubbard

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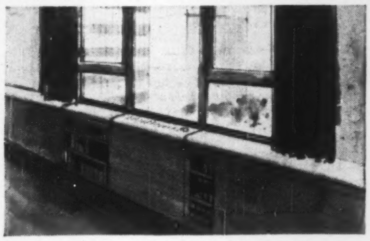

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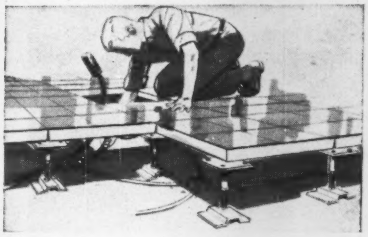

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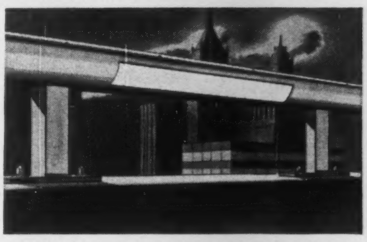

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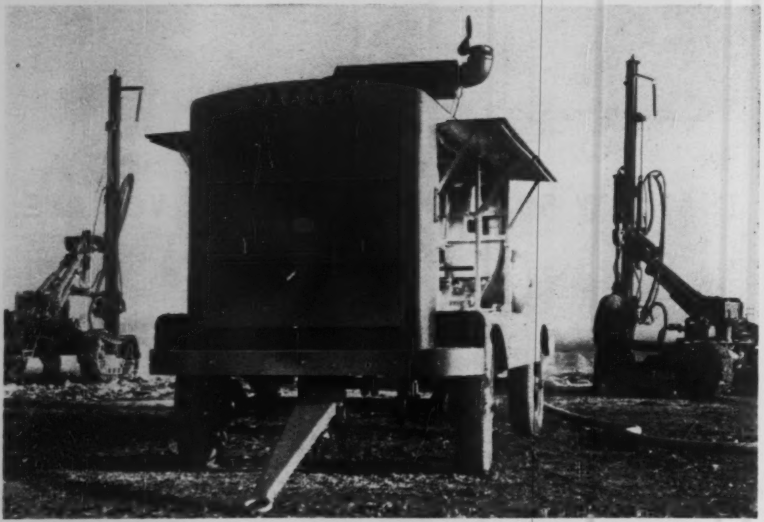
CONSTRUCTION MACHINERY CO., Waterloo, Iowa
ESSICK MANUFACTURING CO., Los Angeles, California
THE GORMAN-RUPP CO., Mansfield, Ohio
HALE FIRE PUMP CO., Conshohocken, Pennsylvania
JACUZZI BROS., INC., Richmond, California
THE JAEGER MACHINE CO., Columbus, Ohio
McGOWAN PUMP DIVISION, Leyman Manufacturing Corp., Cincinnati, Ohio
MARLOW PUMPS, Division of Bell & Gossett Co., Midland Park, New Jersey
MIDLAND PRODUCTS CO., Mahwah, New Jersey
PEERLESS PUMP, Hydrodynamics Division, Food Machinery & Chemical Corp. Los Angeles, California
RICE PUMP & MACHINE CO., Belgium, Wisconsin
STERLING MACHINERY CORP., Los Angeles, California
WORTHINGTON CORPORATION, Standard Pump Division, East Orange, New Jersey

CIRCLE 58 ON READER SERVICE CARD



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THE JAEGER MACHINE CO., 200 Dublin Ave., Columbus 16, Ohio

(Continued from page 210)

Double "A" Homes, Inc., 838 E. Wilson, **Orange, Calif.**, Owner Builds, **$562,250,** 40 stucco DWELLINGS, S. California St. and Chalynn Dr., Tract 3938, ORANGE, CALIF.

S. & S. Constr. Co., 8857 W. Olympic Blvd., Beverly Hills, Calif., CA **$916,200,** 72 DWELLINGS, Tract 3810, GARDEN GROVE, CALIF. Darin Corp., 8857 W. Olympic Blvd., Beverly Hills, Calif.

Westwood Corp., 10835 Santa Monica Blvd., Los Angeles 25, Calif., Owner Builds, **$672,000,** 56 DWELLINGS, Tract 3389, GARDEN GROVE, CALIF.

Erickson Constr. Co., 977 Arden Way, Sacramento, Calif., LB **$692,913,** (7 bidders), NURSING HOME, SACRAMENTO, CALIF. Sisters of Mercy, Mercy Hospital, 40th and J Sts., Sacramento, Calif. BA 2/23. CD 2/10/61.

M. H. Golden, 3485 Noell St., San Diego 1, Calif., CA **$947,000,** MEN'S and WOMEN'S DORMITORY and CAFETERIA BLDG. ADDN., Cal-Western University, SAN DIEGO, CALIF. Cal-Western University, 3902 Loma Land Dr., San Diego 7, Calif. BA 2/28, CA 3/7. CD 3/7/61, under LB.

Venton Estates, 11065 Reseda Blvd., Northridge, Calif., Owner Builds, **$562,300,** 56 DWELLINGS, Rennell and Tudo Aves., SAN DIMAS, CALIF.

▲ **Meyer & Young Building Corp.**, 679 Portola Dr., San Francisco, Calif., CA Est. **$3,200,000,** 21 story APARTMENT, Russian Hill, SAN FRANCISCO, CALIF. Meyer & Young, c/o contractor. Hewitt C. **Wells**, 165 Jessie St., Francisco, Calif., archt.

Highdale Co., 10835 Santa Monica Blvd., Los Angeles 25, Calif., Owner Builds, **$870,000,** 58 stucco DWELLINGS, Amelia Ave. and Bloomwood Rd., Tract 25154, SAN PEDRO, CALIF.

Pacific Constr. Co., 2826 Kaihikapu St., Honolulu, Hawaii, CA **$877,600,** Ewa Beach INTERMEDIATE SCHOOL, Proj. No. 60-C-201-09, Ewa, HONOLULU, HAWAII. City and Honolulu Co., Punchbowl and King Sts., Honolulu, Hawaii. **(Correction—contractor.)** CD 3/6/61, under CA.

CANADA

HEAVY CONSTRUCTION—LB & CA

▲ **Dagmar Constr. Ltd.**, 101 Crockford, and **J. M. Constr. Ltd.**, 50 Crockford, both in Scarborough, Toronto, Ont., LB **$1,330,880,** 138,000 ft. SEWERS and three PUMPING STATIONS, PARIS, ONT. BA 3/7/61. CD 2/16/61.

Dravo Constr. Ltd., 159 Bay St., Toronto, Ont., LB **$300,183**, Contr. A, SEWAGE TREATMENT PLANT (Paris, Ont.).

▲ **Louis Donolo Constr. Ltd.**, 2790 Dufferin St., Toronto, Ont., CA **$2,085,350,** (8 bidders), POWER PLANT for air terminal, at International airport, Malton, TORONTO, ONT. Dpt. Transport, Hunter Bldg., Ottawa, Ont. BA 12/15/61. CD 12/22/60, under LB.

BUILDINGS—LB & CA

▲ **Perini Ltd.**, 49 Jackes Ave., Toronto, Ont., LB **$7,225,,000,** 15 story, concrete, steel, precast concrete, granite stone ADMINISTRATION BLDG. for Health and Welfare Dpt., Tunneys Pasture, OTTAWA, ONT. Dpt. P. Wks., Hunter Bldg., Ottawa, Ont. BA 3/8/61 CD 2/28/61

▲ **Ron Constr. Co. Ltd.**, 314 Richmond Rd., Ottawa, Ont., CA Est. **$1,000,000,** 1 story, brick, tile, marble BOWLING ALLEY, RESTAURANT, etc., Baseline Rd., OTTAWA, ONT. Arnon Development Corp. Ltd., c/o contractor. Adjeleian, Goodkey, Weedmark & Assocs., Ltd., 77 Metcalfe St., Ottawa, Ont., engrs.

▲ **McNamara (Que.) Ltd.**, 3901 Jean Talon St. W., Montreal, Que., CA Est. **$12,000,000** (10 bidders), IRON ORE TERMINAL, involving grading, construction loading dock, surface storage installations, etc., POINTE NOIRE, QUE. Dominion Dock Co., sub. Wabush Iron Co., Ltd., 1010 St. Catherine St. W., Montreal, Que. BA 2/28/61. CD 2/14/61.

PUERTO RICO

BUILDINGS—LB & CA

▲ **Southern Constr. Co.**, P.O. Box 1076, Mayaguez, Puerto Rico, LB **$1,885,751,** 280 units, rein.-con. HOUSING, Proj. 3092, MANATI, PUERTO RICO. Puerto Rico Urban Renewal & Housing Corp., Box 97, Rio Piedras, Puerto Rico. Paul **Reichard**, 1105 Ponce de Leon Ave., San Juan, **Puerto** Rico, **archt.**

LATIN AMERICA

HEAVY CONSTRUCTION—LB & CA

▲ **ARGENTINA**—BA 4/28—National Hy., Dpt. of Argentine Republic, Avenida Maipu, Buenos Aires, ROADS,

hy. constr., paving and wid'n and four bridges Rte. 18 in Entre Rios Province, $5,500,000;

paving Rte. 126, Entre Rios Province, $4,200,000.

FOREIGN

HEAVY CONSTRUCTION—BA

▲ **Mozambique**—BA 5/3—Mozambique Dpt. P. Wks. & Transport Services, Lourenco Marques, BRIDGE,

bridge and highway constr. National Hy. No. 1 linking Lourenco Marques with Vila de Joao and bridge over Limpop and Chicumbane Rivers. $2,300,000. Extended date. CD 2/27/61.

▲ **England**—Bids Asked—Tyne Tunnel Joint Committee, County Councils, Northumberland and Durham, England, main bore VEHICULAR TUNNEL under River Tyne to connect Jarrow and Howden. $35,000,000.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Calif., Oxnard**—City, 225 W.3 St., voted **$8,500,000** bonds Feb. 28, WATERWORKS, incl. pumping, pipe line and reservoir.

▲ **Ill., Rockford**—City Water Dpt., City Hall, 5 m.g. prestressed concrete RESERVOIR, 45,000 lin. ft., 12 and 16 in. **feeder mains, two 2000 gpm wells,** pumping station equipment, **$750,000;** 1963 **water system imprvts.,** incl. 12 and 16 in. feeder mains, 2 wells, stations and pumping equipment, etc., **$375,000; water system imprvts.,** 12 and 16 in. feed mains and two wells, stations, and equipment, **$550,000.**

▲ **N. Y., Buffalo**—City, Dpt. P. Wks., City Hall, Buffalo River Industries WATER COOLING PROJECT (1) intake river crossings (2) pumping house and equipment, (3) pressure lines. **$6,000,000.** McFarland & Johnson, Sidway Bldg., Buffalo, N. Y. and St. John Platt & Carlson, 86 West Chippewa St., Buffalo, N. Y., engrs. Bids About May 24. CD 5/6/60.

▲ **N. Y., New York**—Bd. Water Supply, 120 Wall St., New York, Zone 5, Proj. W-7, Richmond WATER SUPPLY UNNL under Upper New York Bay, Richmond and Manhattan Boros. **$24,200,000** appropriated. CD 5/25/59.

▲ **O., Cincinnati**—City, City Hall, rein.-con. slab COVER FOR WEST BASIN, Eden Park Reservoir. **$2,000,000.** Black & Veatch, 1500 West Meadow Lane Parkway, Kansas City, Mo., consult. engrs. Bids late in Summer. CD 4/25/60.

R. I., **Pawtucket**—City, City Hall, DAM, Diamond Hill Reservoir, **$700,000.** Cooper, Ruggieri & Assoc., 507 Union Trust Bldg., Providence, consult. engrs. Bids June 1961.

▲ **Va., Manassas**—Bd. Supervs., Prince William Co. Manassas, **$1,000,000** bond election Apr. 4, WATERWORKS **improvements,** Dumfires-Triangle District. CD 6/30/60.

SEWERS, WASTE DISPOSAL

▲ **Ala., Prichard**—City, City Hall, OUTFALL SEWERS, **$1,450,000,** J. B. Converse & Co., Inc., 508 Dauphin St., Mobile, consult. engr.

▲ **Colo., Englewood** — City, City Hall, Open SEWER DRAINAGE SYS. **$2,391,000.** Harold Hoskins & Assocs., 1019 Eighth Ave., Greeley, consult. engrs.

▲ **Fla., St. Petersburg**—City, City Hall, NORTHEAST and NORTHWEST SEWAGE TREATMENT PLANTS expansion. **$2,000,000.**

▲ **N. J., Union Beach (Br. Keyport)**—Borough Union Beach, Municipal Bldg., SEWERAGE SYSTEM, **$1,410,000.** A. J. Lanning Co., South Broad St., Trenton, consult. engr.

▲ **Wis., Milwaukee**—Metropolitan Sewerage Comn. of County of Milwaukee, Box 2079, 144 in. diam. main SEWER in Pennsylvania Ave. from Drexel. to Rawson Aves. Oak Creek, **$3,000,000;** 144 in. diam. main SEWER in Pennsylvania Ave. from Rawson to College Aves, Oak Creek **$3,000,000.** Alvord, Burdick & Howson, 20 N. Wacker Dr., Chicago, Ill., consult. engrs. CD 1/6/58.

BRIDGES

▲ **Fla., Clearwater**—Pinellas Co., County Bldg., Welch CAUSEWAY, 150th Ave., Maderia Beach. **$1,100,000.**

Fla., **Fort Lauderdale**—City, City Hall, BRIDGE on N.W. 7th Ave. at New River. **$800,000.** J. E. Greiner Co., 1106 N. Charles St., Baltimore, Md., consult. engr.

▲ **IDAHO**—State Hy. Comn., Boise, BRIDGES,
Bannock Co.—4 structures on 3.6 mi. Interstate 15, **$513,000.**
Bonner Co.—bridge on US 2, **$150,000.**
Bonneville Co.—9 major structures on 9.6 mi. Interstate 15, **$821,000.**
Kootenal Co.—3 structures on 1.3 mi. Interstate 90, **$637,000.**

▲ **Ontario and Quebec**—Dpt. P. Wks., Hunter Bldg., Ottawa, Ontario, Dpt. P. Wks., Parliament Bldg., Toronto, and Quebec Dpt. of P. Wks., Parliament Bldgs., Quebec City, 1,600 ft. 6 lane BRIDGE across Ottawa River joining Ottawa, Ont., and Hull, Que. **$12,000,000.** Beauchemin-Beaton-Lapointe, 6655 Cote des Neiges Rd., Montreal, Que., consult. engrs., for Province of Quebec, and Laughlin, Wyllie & Ufnal, 53 Kipling Ave. S., Isllington, Toronto, Ont., consult. engrs., for Province of Ontario. CD 3/7/61.

STREETS AND ROADS

▲ **ALABAMA**—State Hy. Dpt., Montgomery, Zone 4, ROADS,
MARION CO.—two-three and four-lane 6 mi. on US 78 from Winfield east to Walker County line, **$1,500,000.** Bids Late Summer.

▲ **MICHIGAN** — State Hy. Dpt., 732 Mason Bldg., Lansing, ROADS,
Mecosta Co.—modernization 9 mi. M-66 from Mecosta-Montcalm Co. line, north to junction M20 at Remus, **$1,000,000.** Constr. 1966.
Oceana Co.—relocation 15.3 mi. M-82 from point south of Hesperia west to U.S.-31, **$2,000,000.** Constr. 1964.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg,
Mercer Co.—7.7 mi. sect. Keystone Shortway, Interstate Rte. 80, between point 3.5 mi. west of TR 19 and proposed interchange with Interstate Rte. 79, east

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CIRCLE 216 ON READER SERVICE CARD

of T.R. 19, **$7,500,000**, Green Engineering Co., Sewickley, consult. engr. CD 7/23/58.

11.3 mi. sect. Keystone Shortway, Interstate Rte. 80, between Ohio State Line and 3.5 mi. west of T.R. 19, **$14,000,000**, Michael Baker, Inc., Rochester, engr.

Tex., Richland Hills—City, c/o Clyde Zellers, mayor, bond election Mar. 18, STREETS REPAIR, repave, storm drain extensions, **$827,000.** CD 5/6/59.

Wash., Kennewick—City, City Hall, **$850,000** bond election May 9, ROAD IMPRVS., 4th Ave. between Olympia St. and Hy. 8, Canal Dr. and 10th Ave., between Buntin and Oak Sts. and Washington St. between Columbia and 16th Aves., **$850,000.** CD 1/23/61.

▲ **QUEBEC**—Provincial Dpt. of Roads, Parliament Bldgs., Quebec City,
Hull—completion No. 11 Hy. **$3,500,000.**

EARTHWORK, WATERWAYS

▲ **Ark., Forrest City**—Owner, c/o Max Sulcer, 1412 Carlisle Lane, West Memphis, earthen DAM and 1,000 acre LAKE on Crow Creek northeast of here. **$2,000,000.** Robert E. Howell & Assocs., 1116 E. Broadway, West Memphis, consult. engrs.

▲ **Tenn., Shelbyville** — Shelbyville Housing Authority, EARTHEN DAM, rein.-con. flumes, pumping station, Big Spring Branch, **$1,300,000.**

AIRPORTS

Tenn., Rockwood—City and Tenn. Bureau Aeronautics, Berry Field, Nashville, AIRPORT GRADING, PAVING. **$768,000.** John T. Talbert, Jr. & Associates, P.O. Box 1394, Wilmington, N. C., consult. engrs. CD 10/19/59.

UNCLASSIFIED

▲ **Ala., Mount Vernon**—The Houston Co., First Federal Bank Bldg., St. Petersburg, Fla., NATURAL GAS COMPRESSOR STATION. **$1,000,000.**

▲ **Fla., Bonifay**—The Houston Co., First Federal Bank Bldg., St. Petersburg, NATURAL GAS COMPRESSOR STATION. **$1,000,000.**

▲ **Fla., Orlando**—The Houston Co., First Federal Bank Bldg., St. Petersburg, NATURAL GAS COMPRESSOR STATION. **$1,000,000.**

▲ **Fla., Perry**—The Houston Co., First Federal Bank Bldg., St. Petersburg, NATURAL GAS COMPRESSOR STATION. **$1,000,000.**

▲ **Fla., St. Petersburg**—City, City Hall, residential street LIGHTING. **$2,300,000.**

Kentucky—Kentucky Utilities Co., 120 S. Limestone St., Lexington, 69,000 volt TRANSMISSION LINE between Georgetown and Lexington. **$772,000.** Constr. 1961.

▲ **N. J., Paterson**—Arena Management Corp., 266 Ellison St., plans by Tischler & Comerro, 195 Broadway, SPORTS ARENA, 16th Ellison Carroll and Straight Sts. **$2,000,000.**

▲ **Texas**—Houston Lighting & Power Co., 1016 Walker St., Houston, Dallas Power & Light Co., 1506 Commerce St., Dallas, Texas Power & Light Co., Fidelity Union Life Bldg., Dallas, and Texas Electric Service Co., 113 New St., Fort Worth, 345,000 volts ELECTRIC TRANSMISSION LINE between Dallas and Fort Worth areas to Houston. **$25,000,000.** Bids 1st ½ of 1962.

▲ **Ont., Toronto**—Toronto Harbor Comrs., 60 Harbour St., 210 x 660 ft. MARINE TERMINAL NO. 1 and docking area at east end Toronto Harbor, incl. guard house, paving, sewer and water services. **$1,500,000.** Bids March-April 1961. CD 3/14/60.

PUBLIC BUILDINGS

▲ **Ala., Athens**—Athens Housing Authority, low-rent HOUSING UNITS. **$1,000,000.**

▲† **Ala., Fort Rucker**—U. S. Eng., 2301 Grant St., Mobile, plans by Pearson, Tittle & Narrows, 401 1st National Bank Bldg., Montgomery, 498 Capehart HOUSING UNITS, **$5,000,000.** Moseley & Yarbrough, 239 Dexter Ave., Montgomery, mech. engrs. (**Correction**—project location). CD 3/7/61, under Fla., Fort Rucker.

▲ **Calif., Bakersfield**—Kern Co. Union High School and Junior College Dist., 2000 24 St., plans by Wright, Metcalf & Parsons, 2323 "E" St., 1 and 2 story steel frame SCIENCE UNIT, Bakersfield Junior College. **$1,000,000.** CD 2/18/60.

▲ **Colo., Fort Collins**—State Planning Division, State Capitol, Denver, plans by James M. Hunter, 1126 Spruce St., Boulder, LIBRARY ADDN., Colorado State University, **$1,000,000.**

▲ **Colo., Colorado Springs**—City, City Hall, LIBRARY. Approx. **$1,000,000.**

▲ **Conn., Ansonia**—Housing of City of Ansonia, 15 Maple St., plans by Seb. J. Passanesi, 164 Court St., Middletown, 165 units, 3 story, garden type APARTMENTS, Broad St. area, Federal Low-Rent. **$2,672,487**, CD 10/25/60.

▲ **Conn., Brookfield**—Town, Town Hall, plans by Lyons & Mather, 211 State St., Bridgeport, JUNIOR HIGH SCHOOL ADDN., Long Meadow Hill, **$1,000,000.**

▲ **Calif., Roseville**—City, City Hall, plans by Rex Allen, 693 Mission St., City HOSPITAL ADDNS., 333 Sunrise Ave. **$1,000,000.** Haluk Akol, 507 Howard St. S.E., consult. engr. CD 9/2/59.

Colo., Buena Vista—Colorado State Reformatory, Buena Vista, plans by James H. Johnson & Assocs., 7675 W.

14th Ave., Denver, 1 story ADJUSTMENT and RECEIVING BLDG. **$735,000.** CD 9/29/55.

▲† **Colo., Denver**—Base Procurement Office, Lowry Air Force Base, plans by Buell & Co., 730 14th St., First Phase Capehart HOUSING, Lowry Air Force Base, **$3,000,000** (no appropriation); Second Phase, Capehart HOUSING (350 Homes), Lowry Air Force Base, **$4,000,000** (no appropriation).

▲ **Fla., Fort Lauderdale**—Broward Co. Bd. Instruction, Admin. Bldg., 1320 SW 4th St., plans by William Crawford, 2114 NE 21 St., HIGH SCHOOL NO. 2, **$2,000,000.** Bids May 1961.

Fla., Fort Lauderdale—City, City Hall, plans by Ervay J. Baker & Assocs., 1920 S. Andrews Ave., PUBLIC WORKS BLDG. **$800,000.**

▲† **Fla., Fort Rucker**—U. S. Eng., 2301 Grant St., Mobile, plans by Pearson, Tittle & Narrows, 401 1st National Bank Bldg. Montgomery, 498 Capehart HOUSING UNITS. **$5,000,000.** Moseley & Yarbrough, 239 Dexter Ave., Montgomery, mech. engrs. CD 11/15/60.

▲ **Fla., St. Petersburg**—City, City Hall, PUBLIC LIBRARY and SOUTHSIDE BRANCH LIBRARY, **$1,100,000.**

▲ **Fla., Tampa.**—State Bd. Control, University of Southern Florida, 46th St. and Fowler Ave., Gainesville, plans by Pullara & Watson, 2910 Grand Central Ave., HUMAMITIES CLASSROOMS BLDG., University of Southern Florida, **$1,500,000.** Bids July 1961.

▲ **Ga., Hartwell**—Georgia State Dpt. Corrections, 415 State Capitol, Atlanta, plans by Albany Architects & Engineers, P.O. Box 1778, Albany, 250,000 sq. ft. State PRISON. **$4,000,000.** J. L. Lindsey, 415 Pine Ave., Albany, Ga., struct. engr. Joseph W. Turner, Jr. & John H. Scott, 113½ Pine Ave., Albany, mech. engrs. CD 1/11/61.

▲ **Ill., Skokie**—Nilles Twp. High School, Oakton St. and Edens Hy., voted bonds Mar. 4, North HIGH SCHOOL, **$5,975,000;** East HIGH SCHOOL, **$900,000.** CD 2/27/61.

Me., Hallowell—School Dist. 16, Bldg. Comn., Hallowell, plans by Bunker & Savage, 16 Winthrop St., Augusta, HIGH SCHOOL, Maple St., Framingdale. **$740,000.** Maine Engineering Service Co., 133 Court St., Auburn, consult. engr. CD 10/27/60.

▲ **Md., Rockville**—Montgomery County Bd. Educ., County Bldg., plans by Rhees Burket, 8410 Ramsey Ave., Silver Spring, Randolph JUNIOR HIGH SCHOOL near Wheaton Plaza, Wheaton, **$1,657,000;** Parkland JUNIOR HIGH SCHOOL, Aspen Knolls, Rockville, **$1,657,000;** plans by Johannes & Murray, 855 Pershing Dr., Silver Spring, Leland JUNIOR HIGH SCHOOL, **$1,590,000,** or REMODELING SCHOOL for Leland Junior High School, Chevy Chase, **$1,122,000.**

▲ **Mass., Greenfield**—Franklin Co. P. Hospital, Bd. Trustees, High St., HOSPITAL EXPANSION. **$1,000,000.** Bids May 1961.

▲ **Mich., Rochester**—Michigan State University, Oakland Branch, Walton and Squirrel Rds., Pontiac, plans by O'Dell, Hullett & Luckenbach Assocs., 950 Hunter Blvd., Birmingham, AUDITORIUM adjoining Meadow Brook Hall. **$2,000,000.**

▲ **Minn., St. Paul**—St. Paul Housing & Redevelopment Auth., 60 East Fourth St., Zone 1, plans by Cavin & Page, 360 Robert St., Proj. No. Minn. 1-5, 55 ROW-HOUSE UNITS near Marshall Ave. and Victoria St. and 140 units, Kent St. and St. Anthony Ave., **$2,306,750,** Bids 1961; plans by The Cerny Assocs., Inc., 300 First National Concourse Bldg., Minneapolis, Proj. No. Minn. 1-6, 200 DWELLING UNITS for elderly, Valley St. and Canada St., **$2,109,000,** Bids 1961; plans by Ellerby & Co., 333 Sibley St., Proj. No. Minn. 1-7, 15 ROW-HOUSE UNITS, W. Curtice St. and Livingston Ave. and 140 dwelling units for elderly, Laurel Ave. and Virginia St., **$1,684,000,** Bids 1961; plans by Adkins & Johnson, Endicott on Fourth Bldg.; Proj. No. Minn. 1-8; 150 ROW-HOUSE UNITS, Arondel and Larpenteur Aves., $2,422,500. Bids 1961.

▲ **Mo., Kennett**—Dunklin Co., Court House, plans by Hewitt & Rogers, archts.-engrs., 607 West Post Rd., Kansas City 11, Mo., 65-bed county HOSPITAL, near here. **$1,500,000.** CD 3/1/61.

▲ **Mo., Springfield**—City, City Hall, **$9,380,000,** bond election June 6, 4th unit GENERATOR, James River Power Plant. CD 10/24/57.

▲ **Neb., Omaha**—School Dist. 66, 8727 Shamrock Rd., plans by Leo A. Daly Co., 8600 Indian Hills Rd., voted $6,000,000 bonds Feb. 28, JUNIOR HIGH SCHOOL, **$1,400,000.** Bids May 1961. CD 2/16/61.

▲ **Nev., Reno**—County of Washoe, Bd. Co. Comrs. County Courthouse, plans by Vhay Associates, 508 Denslowe Dr., Washoe MEDICAL CENTER ADDN., ALTERATIONS, **$2,300,000.** CD 9/23/58.

▲ **N. H., Swanzey**—Union School Dish., Supt. Schools, plans by Dirsa & Lampron, 814 Elm St., Manchester and John R. Holbrook, assoc. archt., 36 Carpenter St., Keene Co-operative HIGH SCHOOL, **$1,800,000.** Bids May 1961. CD 3/3/60.

N. H., Tilton—Town, William M. Lawrence, School Study Comn., 32 Chestnut St., HIGH SCHOOL ADDN. and JUNIOR HIGH SCHOOL, **$850,000.** Bids June 1961.

N. J., Burlington—Burlington School Bd., Burlington, plans by Frederic P. Weidersum Assocs., 238 West State St., Trenton, HIGH SCHOOL, Over **$750,000.** Bids in Summer-Fall.

▲ **N. J., Kearny**—Bd. Educ., 100 Davis Ave., plans by Fava & Saunders, 30 James St., Newark, GRAMMAR SCHOOL. **$1,500,000.**

▲ **N. J., Lakewood**—Housing Auth. City Lakewood, 213-3rd Ave., 100-unit Public Housing. **$1,000,000.**

(Continued on page 220)

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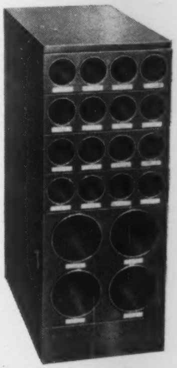

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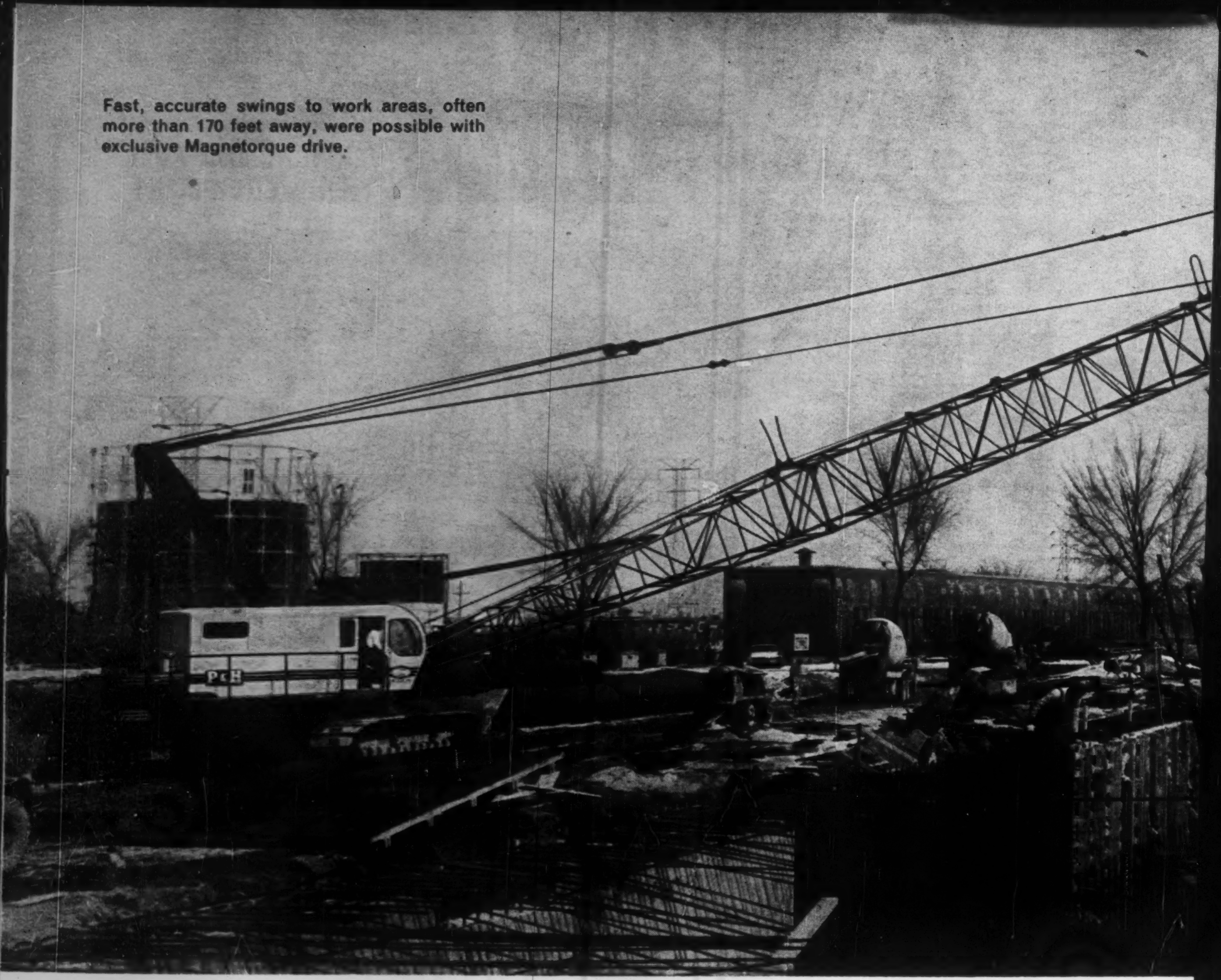
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"Long reach with Magnetorque swing makes the difference ...it's the key to efficient operation"

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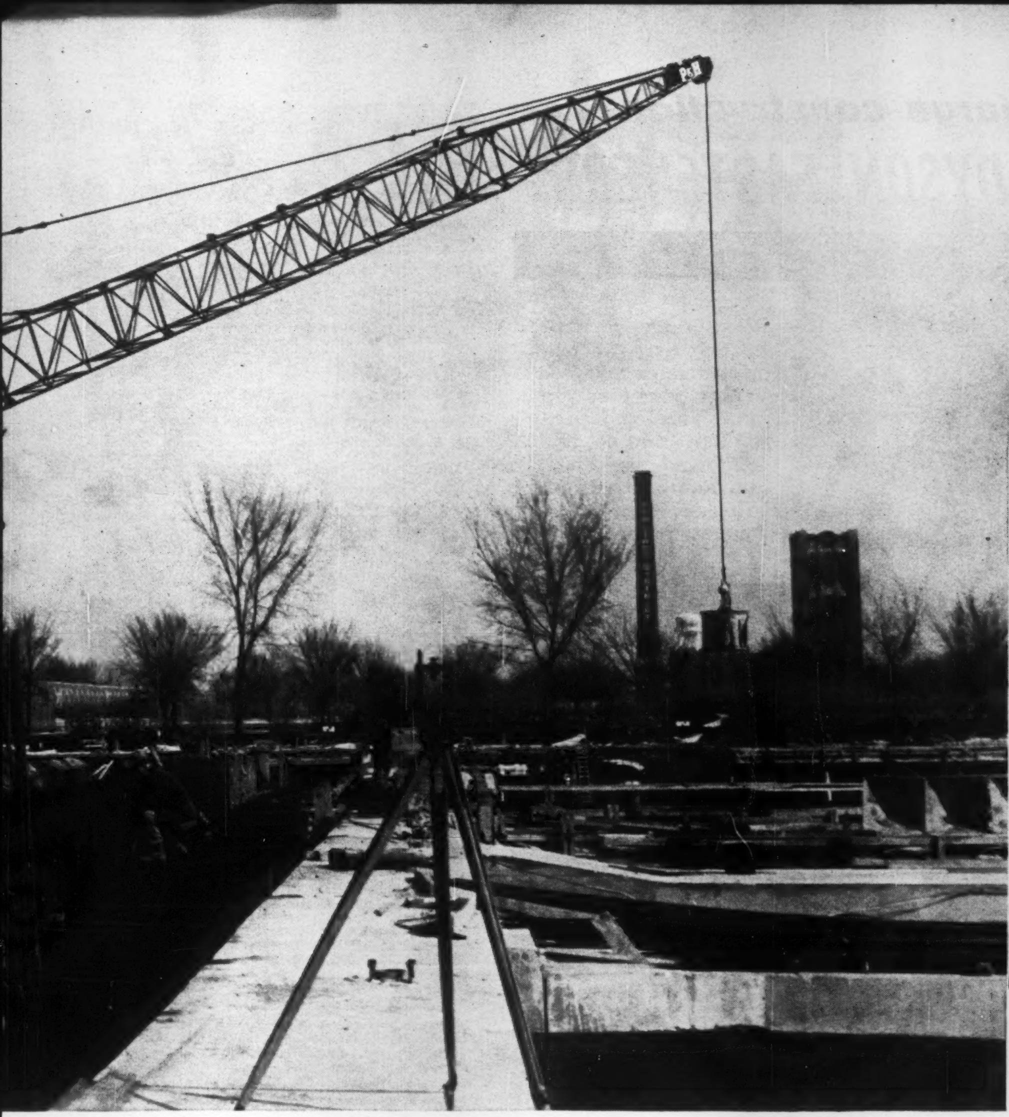
Here's what F. A. Miller, Construction Manager has to say . . . "*Without a doubt, our 110-ton P&H Crane has been the key to this operation. Its lived up to our every expectation. For example—we've poured concrete over 170 feet away with a 200 foot boom and a 1-yard bucket . . . over 150 feet away with a 2-yard bucket. Its got the fastest, controlled swings of any crane I've seen. We're ahead of schedule and our work is proceeding smoothly, efficiently as planned . . . thanks to our P&H.*"

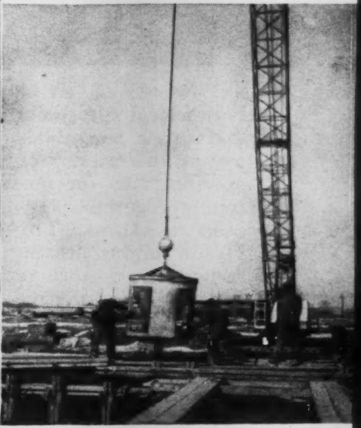
Long Reach—the ability to handle up to 300 feet of boom permitted J. L. Simmons Company to work from the perimeter of the job and spot light loads anywhere . . . resulted in faster, more economical construction, more efficient operation.

Fast, Effortless Swings—with exclusive Magnetorque® drive. The big crane gave Simmons more work loads per hour and smoother, more accurate starting and stopping . . . Highly important in this operation where long, safe swings were a necessity.

Big Capacity—with a rating of 110 tons, the P&H had more than enough capacity to handle the big work loads of concrete and equipment at those far-



Long reach of the 110-ton P&H permitted efficient work procedure. Here the crane loads concrete bucket from mixer truck on job perimeter before delivery to work area.



Precise spotting of work loads was a cinch due to P&H planetary boom hoist, unmatched stability and positive-action hydraulic controls.

out reaches . . . enabled Simmons to maintain top production and uninterrupted work flow.

Accurate Spotting of Loads—precise accuracy in spotting loads at far-out reaches was a problem on this job—and was solved through Independent Planetary Boom Hoist, which permitted power lowering of the boom, together with the simple Hydraulic Control System—where the slightest lever or pedal movement produced immediate response—resulted in smoother work cycles with no lost time jockeying for position.

Unmatched Stability—the ability to handle up to 300 feet of boom and the rated loads with utmost accuracy and safety were the result of P&H balanced design, even weight distribution and the extra wide 16′ 10″ crawler assembly. It was this built-in stability that permitted those long reaches with full capacity loads.

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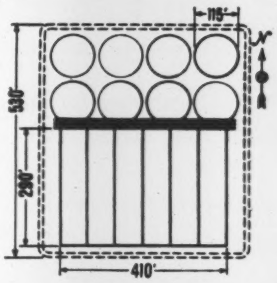

- ● 8 circular, final settling tanks, each 115′ in diameter.
- ☐ Overhead gallery separates aeration and settling tanks.
- ☐ Adjoining aeration tanks form huge rectangle 290′ x 410′.
- === work path of P&H crawler crane

Overall job layout and type of unit construction indicates importance of perimeter work operation.

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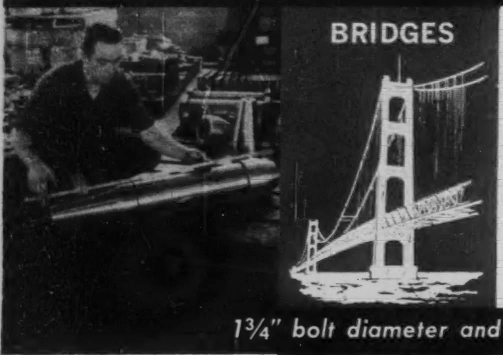
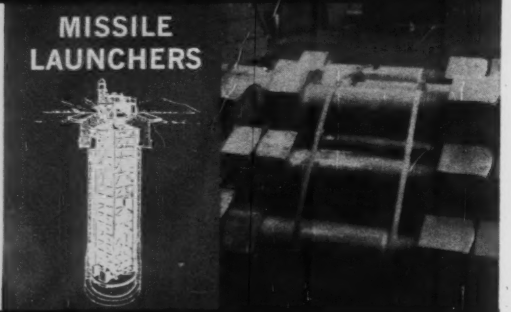
planning large construction?

assemble it with DYSON FASTENERS



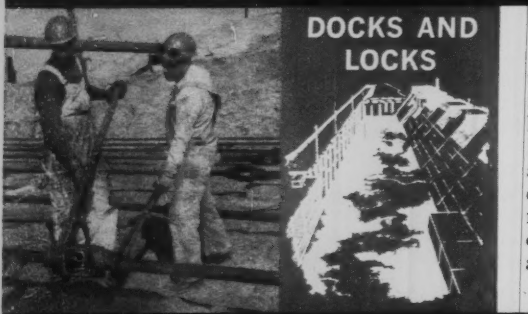
Large bridges are built better with Dyson open and closed wire bridge sockets, pin nuts, pins, and pilot nuts. In addition, Dyson forged large bolts, nuts and studs anchor bridges securely to concrete pilings.

1¾" bolt diameter and up



Dyson large nuts, bolts and other assemblies are made to exact specifications for fastening together launcher systems. The Dyson forging process provides resistance to fatigue, shock and torsion.

Prompt delivery on standard or special large fastener requirements



Dyson rod assemblies tie together dock piling more securely at less cost, and other Dyson large fasteners are used in locks and docks, economically meeting the demands of superior ruggedness and safety.

Free Selector guide

Specifications and dimensional data on threaded rods, clevises, turnbuckles, coupling nuts, sleeve nuts. Write for Bulletin 1260.

Jos. Dyson & Sons, Inc., 5155 St. Clair Ave., Cleveland 3, Ohio • HE 1-6157

DYSON

(Continued from page 217)

▲ N. J., **Ocean City**—City, City Hall, PUBLIC SAFETY BLDG. **$3,000,000.**

▲ N. Y., **Grand Island**—Grand Island Central School Dist. 1, bond election Mar. 28, HIGH SCHOOL. **$3,787,000.** Pfohl, Stohl & Roberts, 185 Niagara St., Buffalo, archts. CD 2/17/60.

▲ N. Y., **Great Neck**—Bd. Educ. UFSD No. 7, 345 Lakeville Rd., $2,385,000 referendum Mar. 29, Red Book ELEMENTARY SCHOOL, east of Upper Middle Neck Rd., north of Forest Row, Village of Kings Point. **$1,719,200.** Moore & Hutchins, 800 2nd Ave., New York, Zone 17, archts. CD 11/23/60.

▲ N. Y., **Hastings-On-Hudson**—Union Free School Dist. No. 4, Farragut Ave., referendum June 12, Hillside ELEMENTARY SCHOOL (K-3), About **$1,000,000;** Hastings HIGH SCHOOL ADDN., Over **$500,000.** Eggers & Higgins, 100 E. 42 St., New York 17, N. Y., archts.

N. Y., **North Salem**—Town, Town Hall, plans by Warren H. Ashley, 726 N. Main St., West Hartford, Conn., JUNIOR-SENIOR HIGH SCHOOL. **$750,000.**

▲ N. Y., **Ossining**—Town, Town Hall, plans by Warren H. Ashley, 726 N. Main St., West Hartford, Conn., JUNIOR HIGH SCHOOL. **$1,500,000.**

▲ N. Y., **Oyster Bay**—Oyster Bay-East Norwich School Dist., E. Main St., **$2,300,000** referendum passed Mar. 4, two GRADE SCHOOLS, Memorial Field and Forest Field. CD 3/2/61.

▲ N. C., **Beaufort**—Bd. Comrs. Carteret Co. Courthouse, plans by George Watts Carr, 111 Corcoran St. Bldg., Durham, HOSPITAL, Morehead City, **$1,700,000.** CD 11/25/60.

O., **Sharonville**—Princeton Loc. School Dist., 10924 Reading Rd., plans by Winkler-Ranck & Beeghly, Dollar Fed. Bldg., Hamilton, 2 story, brick, JUNIOR HIGH SCHOOL, north of Sharon Ave., Reading, **$800,000.** Bids late 1961.

▲ Ore., **Eugene**—City, City Hall, bond election May 11, CITY HALL, **$2,400,000.**

▲ Pa., **Ambler**—Ambler-Lower Gwynedd-Whitpain Joint School System plans by Buchart Assocs., 611 W. Market St., York, Wissohickon SENIOR HIGH SCHOOL, Bethlehem Pike, **$2,500,000.** Bids Summer 1961.

▲† Pa., **Coatesville**—Veterans Admin., Munitions Bldg., Wash., D. C., plans by Buchart Assocs., 611 W. Market St., York, LAUNDRY and GARAGE ADDN., and CAFETERIA, **$1,765,000.** Bids Summer 1961. CD 8/19/60.

▲ R. I., **Howard**—State R. I. & Prov. Plants, Dpt. Admin. Div., Purchase, State House, Providence, Boy's TRAINING SCHOOL, **$1,930,000.** Bids June 1961. CD 11/11/59.

R. I., **Kingstown**—State R. I. & Prov. Plants, Div. Purchase, State House, plans by Harkness & Geddes, archts.-engrs., 17 Custom House St., Providence, HEALTH SCIENCE CENTER, University of Rhode Island, **$700,000.** Bids June 1961.

S. C., **Charleston**—City School Dist. No. 20, 67 Legare St., plans by Leonard C. Gaines, 183 King St., HIGH SCHOOL, **$915,000.** CD 10/25/60.

Tenn., **Lawrenceburg**—Lawrenceburg Housing Authority plans by George Javo, 324 Walco Bldg., Atlanta, Ga., 60 low rent HOUSING UNITS, Smith St. **$800,000.** Bids late Spring 1961.

▲ Tenn., **Nashville** — State Building Comn., Nashville, plans by Burkhalter-Hickerson & Associates, 908 2nd Ave. S., MAXIMUM SECURITY BLDG., Tennessee State Prison, **$1,000,000.**

▲ Tex., **Ysleta**—Ysleta Ind. School Dist., Ysleta, plans by Carroll & Daeuble, 1001 E. Yandell Blvd., El Paso, ELEMENTARY SCHOOL NO. 2, **$475,000;** ELEMENTARY SCHOOL NO. 3, **$450,000;** ELEMENTARY SCHOOL, **$575,000.** CD 6/1/60.

Vt., **Burlington**—State Vermont, State Bldg., Council, State House, Montpelier, TUBERCULOSIS HOSPITAL. **$900,000.** Bids in June.

▲ Va., **Leesburg**—Loudoun Co. School Bd., Leesburg, voted $3,000,000 bonds Feb. 14, Broad Run SCHOOL, **$500,000;** Purcellville HIGH SCHOOL, **$1,500,000.** CD 1/23/61.

Va., **Lynchburg**—City School Bd., 11th and Court Sts., plans by J. Everette Fauber Jr., Allied Arts Bldg., LOCKSVIEW-FAIRVIEW ELEMENTARY SCHOOL. **$740,000.**

▲ Que., **Asbestos**—School Bd. of Asbestos, Asbestos, plans by Richard Geoffroy, 15 Del'Eglise St., Ste. Therese, Regional Secondary SCHOOL, Ste. Elizabeth, **$1,000,000.**

▲ Que., **Drummondville**—School Bd. of Drummondville, SECONDARY SCHOOL for GIRLS, **$1,000,000.**

▲ Que., **Hull**—Province of Quebec P. Wks. Dpt., Parliament Bldgs, Quebec City, HOME FOR AGED, Mountain Rd. **$2,000,000.**

COMMERCIAL BUILDINGS

▲ Ala., **Gadsden**—Baptist Memorial Hospital, 1137 7th Ave., plans by Charles H. McCauley, 1917 5th Ave. S., Birmingham, 101,000 sq. ft. 150-bed HOSPITAL. **$2,400,000.** Strickland & Assocs., 701 S. 37th St., Birmingham, struct. engrs. Hazzard, McRoy & Cone, 3015 6th Ave. S., Birmingham, and W. V. Guy, 701 S. 37th St., Birmingham, mech. engrs. CD 3/24/59.

Ala., **Mobile**—Greystone Christian School, Inc., 959 Government St., plans by Joseph Coleman & Assocs., 4129 S. Peoria, Tulsa, Okla., ELEMENTARY SCHOOL-CHURCH. **$700,000.** Burmeister & Bealle, 1914½ Grant St., Mobile, Ala., assoc. archts. C. R. Flyntt, 1914 W. Independence, Tulsa, Okla., consult. engrs. Netherton & Dollmeyesolnok, 4232 S. Peoria, Tulsa, Okla., mech. engrs. CD 11/22/60.

▲ **Ala., Montgomery**—Southern Baptist Assn., 143 Adams plans by Sherlock, Smith & Adams, 303 Washington Ave., 83,000 sq. ft. 200-bed HOSPITAL, Southern By-Pass **$1,000,000.** Bids Summer 1961.

▲ **Calif., Fremont**—Jack Prouty, c/o Hale & Jacobson, archts., 43291 Mission Blvd., SHOPPING CENTER, MALL, 150 units MOTEL, APARTMENTS. **$20,000,000.**

▲ **Conn., New Britain**—David T. Chase, 85 King Philip Drive, West Hartford, plans by Philip J. Di Corcia, 364 West Middle Tpk., Manchester, 125,000 sq. ft. SHOPPING CENTER, Farmington Ave. **$1,500,000.**

▲ **Fla., Clearwater Beach (Sta. Clearwater)**—Farber Corp. of Fla., 773 Skyway Blvd., St. Petersburg, plans by Baumgartner & Burggraf, 1427 N.E. 26th St., Fort Lauderdale, 14 story, CB-S air conditioning, APARTMENT. **$1,000,000.**

▲ **Fla., Miami Beach**—Meridian Bank & Office Bldg., c/o Lapidus, Kornblath, Harle & Liebman, archts., 940 Lincoln Rd., 9 story, 74 x 126 CB-S and RIC OFFICE and BANK, 1688 Meridian Ave. **$1,000,000.** Oboler & Clarke, 925 Arthur Godfrey Rd., consult. engrs. (**Correction**—estimated cost). CD 3/1.

▲ **Fla., St. Petersburg**—Faber Corp. of Florida, 773 Skyway Blvd., plans by Baumgartner & Burggraf, 1427 N.E. 26th St., Fort Lauderdale, 3 bldg. CB-S, 2-11 story, one 14 story APARTMENT, Treasure Island. **$1,800,000.** Bids late 1961.

▲ **Fla., St. Petersburg**—Meadowlawn Lanes, Inc., 9th St. N. and 63rd Ave., plans by Harry W. MacEwen, 304 Nebraska Ave., Tampa, BOWLING CENTER. **$1,000,000.**

▲ **Ga., Atlanta**—Oglethorpe University, 4484 Peachtree Rd. N.E., plans by A. Thomas Bradbury & Assocs., 60 5th St. N.E., BOYS' DORMITORY, GIRLS' DORMITORY and MARRIED STUDENTS DORMITORY, **$3,000,000.**

▲ **Ga., Atlanta**—Phoenix Investment Co., c/o James C. Wise, Simpson, Aiken & Assocs., archts., 873 Spring St., NW, 2 APARTMENTS Piedmont Ave. between Ellis and Harris St. **$4,000,000.**

▲ **Ga., Atlanta**—United Investment Co., c/o Locatell, Inc., archt., 12 3rd St., NE, Holiday Inn MOTOR HOTEL, Piedmont Ave. **$3,000,000.**

Ga., **College Park**—Scott Hudgens Realty & Mortgage Co., Inc., 433 E. Virginia Ave., plans by Edwards & Portman, 500 Grand Theater Bldg., Atlanta, 5 story, 51,650 sq. ft., OFFICE, Over **$750,000.**

▲ **Ga., Decatur**—Motor Development Co., 66 11th St., NE, Atlanta, plans by Mastin & Summer, 3166 Maple Dr., NE, Atlanta, Howard Johnson MOTOR HOTEL restaurant, swimming pool, **$1,000,000.**

▲ **Hawaii, Kailua** — Windward Oahu Community Assn., and Seventh-Day Adventist Church, Kailua, Oahu, Castle Memorial HOSPITAL, Waimanalo Junction and Kailua Rd. **$1,500,000.** Bids in Summer 1961.

▲ **Ill., Chicago** — Michael Reese Hospital, 2929 Ellis Ave., Women's and Children's HOSPITAL, **$4,250,000;**
2 story, psychiatric research LABORATORY, **$500,000;**
165 bed HOSPITAL, Baumgarden Pavilion, **$4,000,000;**
6 story, 123 bed, Dreyfuss Memorial Research LABORATORY, **$1,750,000,** CD 3/6/59;
HOSPITAL GENERAL SERVICES BLDG., **$1,000,000,** CD 3/6/59;
PATHOLOGY RESEARCH, Laz Chapman Institute, **$500,000;**
CLINIC ADDN., **$500,000,** Bids 1961.

▲ **Mass., Boston**—Reva Enterprise, Inc., 525 Lincoln St., Worcester, plans by Bishop & Hackett, 888 Purchase St., New Bedford, Lincoln Lanes Bowling Center, North Station, **$2,000,000.** Bids in April. CD 11/30/60.

Mass., **Revere**—Revere Memorial Hospital, 204 Proctor Ave., preliminary studies by M. A. Dyer Co., 24 School St., Boston, HOSPITAL ADDN., ALTERATIONS, Proctor Ave. **$800,000.** Bids May 1961. CD 11/6/59.

▲ **Mass., Worcester**—Memorial Hospital, 119 Belmont St., plans by Perkins & Will, 55 Church St., White Plains, N. Y., and G. Adolph Johnson, Inc., assoc. archt., 82 Foster St., Worcester, Mass., CLINICAL RESEARCH LABORATORIES and PHYSICAL THERAPY UNIT, Kendall St. **$1,500,000.** Garlnkel & Marenberg, 100 W. 42 St., New York, N. Y., structural engrs. Sagner & Dalton, 55 Church St., New York, N. Y., mechanical engrs. CD 8/8/55.

▲ **Minn., Bloomington (P. O. Minneapolis)**—Control Data Corp., 501 Park Ave., Minneapolis, plans by Community Planning & Design Assocs., 635 University Ave., St. Paul, 1 story, 100,000 sq. ft. OFFICE and ENGINEERING LABORATORY at Old Shakopee Rd. and S. 34 Ave. **$1,500,000.** J. T. Baker & Assoc. Engrs., 1835 University Ave., St. Paul, Minn., consult. engrs. CD 11/16/60, under Minn., Roseville.

▲ **Minn., Minneapolis**—M. and F. Corrie, 820 Marquette Ave., 5 story MEDICAL ARTS BLDG., Marquette Ave. to S. Ninth St. **$1,000,000.** Liebenberg, Kaplan & Assocs., 51 S. 13 St., consult. engrs. May start constr. next May.

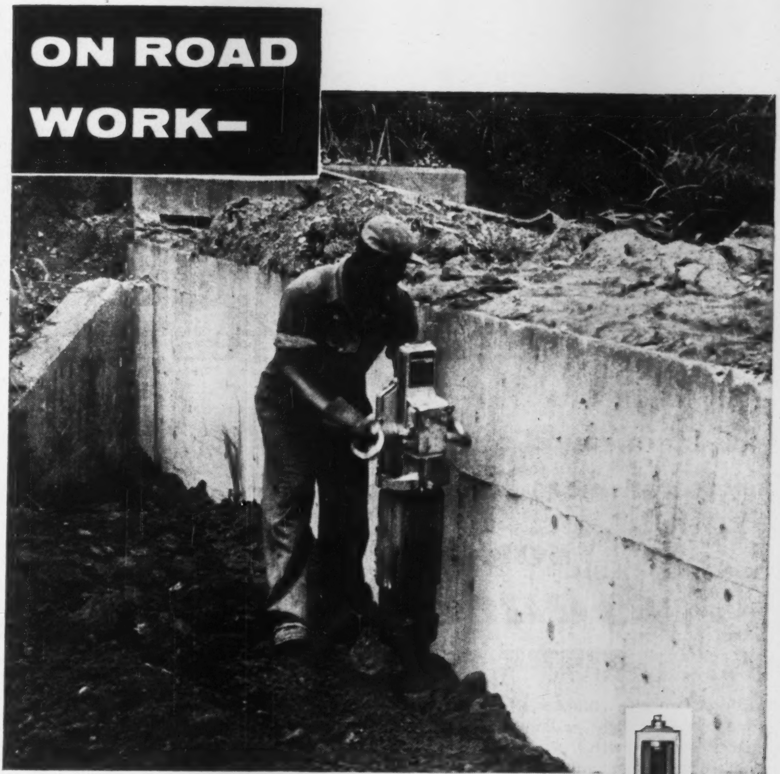
▲ **Minn., Rochester**—F. and T. Voight, 2 story, U-shape, 150-unit Holiday Inn of Rochester, MOTEL, incl. enclosed swimming pool, Hy. 63 at south part of city. **$1,250,000.** Constr. 1961.

▲ **Minn., St. Paul**—Owner, c/o C. K. Erikstrup, engr., Rte. 1, Pilot Knob Rd., 300 APARTMENTS, Joanna's Memorial Manor, Stalt Aid Rd. 19 and Cliff Rd., **$5,500,000.**

▲ **Neb., Lincoln**—Owner, c/o The Heritage Co., 5606 Holdrege St., 2 story, U-shaped 120 unit APARTMENT, 56th and R Sts. **$1,300,000.**

▲ **N. J., Asbury Park**—Owner, c/o Tito P. Di Vincenzo, archt., 136 E. 57 St., New York, N. Y., 1-15 story APARTMENT, **$4,000,000-$5,000,000.** Joseph R. Loring & Assocs., 25 W. 45 St., New York 26,

(Continued on page 224)



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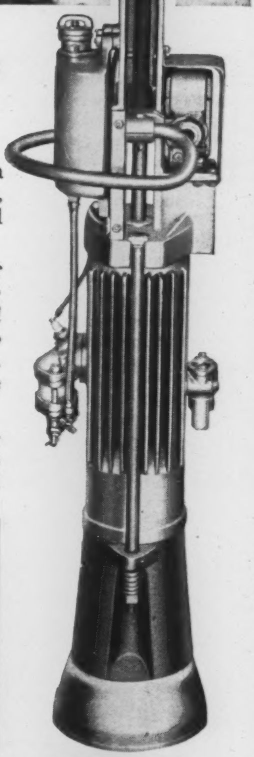

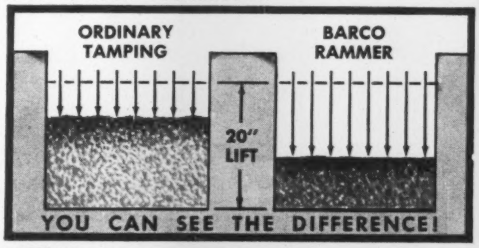

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Round concrete columns offer over-all economy when used as supports in bridges, buildings, and many other structures. They are strong, attractive in appearance, maintenance-free—and low in cost when formed with SONOTUBE Fibre Forms!

Design and Uses. SONOTUBE Fibre Forms are tubular fibre products, designed to provide a low-cost, fast, versatile method of forming round concrete columns. Use them also for round concrete piles, piers, posts, and underpinning, as well as half-round, quarter-round or obround columns and pilasters. A one-time use form, there's no cleaning, no oiling, no return-shipping, no form inventory. Wherever round concrete columns are specified, there's a SONOTUBE Fibre Form type to save you time, labor, materials and money when compared to other forming methods.

Placing. Lightweight and easily handled, SONOTUBE Fibre Forms can be quickly placed by semi-skilled labor. Since the form is one-piece, cut to correct length, there's no bolting, nailing or piecing required. Can be dropped over re-bar cage. Set any number of forms for pouring at one time—no waiting for a limited number of permanent forms to be stripped and reset, and no job holdups.

Tie-in. With their great versatility, SONOTUBE Fibre Forms can be tied into other forms or structural members quicker and easier. Saw for tie-in with beam forms, punch for wall tie-in dowel rods, cut for utility outlets. No other type form provides such simplicity of "custom-cutting" at the job. (Can be used with standard capital forms.)

Bracing. Easily brought to plumb, and only minimum bracing (light lumber or available scaffolding) is required.

Pouring. Pour concrete by conventional methods at normal rate. SONOTUBE Fibre Forms will not swell or lose shape, and concrete can be vibrated without damage to form. These forms have been successfully used for the continuous pour of columns well over 40′ high.

Curing. SONOTUBE Fibre Forms, left in place, prevent moisture loss due to seepage, absorption and evaporation. Proper curing is assured without the use of expensive curing treatments or blankets and water sprays—saving labor, money, and the possibility of damage to the concrete surface.

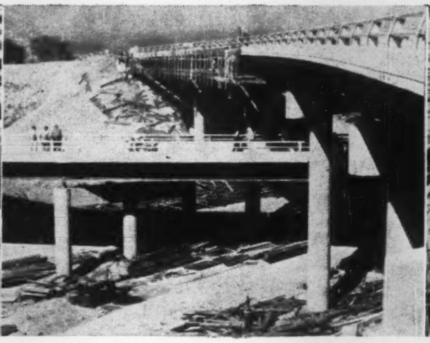
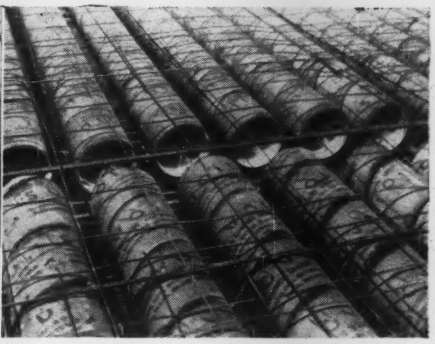
Stripping. SONOTUBE Fibre Forms strip easily and quickly; recommended time 2 to 10 days after pouring. Forms may be left on columns to meet local requirements or for curing purposes, however. (Stripped forms may be wired back on columns for protection during construction.)

Finishing. Little if any finishing is required when the column is formed with Seamless SONOTUBE. Columns formed with "A" Coated SONOTUBE Fibre Forms should be rubbed to obtain a smooth surface. SONOTUBE—formed columns will take paint and a wide variety of other decorative finishes.

Types and Availability. There's a SONOTUBE Fibre Form to meet virtually any job condition or requirement with greatest economy and performance.

1. Seamless—for a smooth, finished concrete surface.
2. "A" Coated—standard form for exposed columns.
3. "W" Coated—for unexposed or unfinished columns.
4. Encasement Form—for encasing existing columns, posts, piles, piers and utility lines with concrete.
5. Special—for use in water or excessive dampness.

Available 2″ to 48″ I.D., standard 18′ lengths or as required. Fast delivery through distributors in major cities coast to coast.

Form weight-reducing voids in floor, roof, deck and lift slabs with

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FIBRE TUBES

In bridges, buildings, and piling, the *voided* system of concrete construction permits greater design flexibility and provides new structural features for lower cost. Voids displace low-working concrete in floor, roof, and lift slabs, bridge decks, beams and piles . . . to reduce weight as well as the amount of concrete and reinforcing steel required without impairing structural strength.

Sonovoid Fibre Tubes were developed to provide an economical means of forming such voids in precast or cast-in-place concrete members. They are low in cost, lightweight, easily handled and placed . . . and save time, labor, materials, and money. They can be sawed on the job to required lengths or ordered in specified lengths – end closures are easily attached.

One and Two-Way Voided Flat Plate Slabs. Many design, structural, and cost advantages may be obtained through the use of Sonovoid Fibre Tubes in floor, roof, and lift slabs in buildings:

1. Voids create lighter weight slabs – with savings in concrete and reinforcing steel. Reduced dead load permits a considerable saving in foundations and structural members, particularly in multi-story buildings.
2. Voided flat plate slabs offer greater design flexibility – permit longer spans, provide better utilization of space and greater freedom in locating partitions – and Lower Over-All Costs!
3. Flat slab forming provides a smooth underside allowing direct application of plaster, paint, tile, and eliminates need for dropped ceiling.
4. Voided slabs, because they are flat, reduce the cubage of structures, with accompanying savings in walls, stairways, elevators, pipes, ducts, wiring, facing, and supports.
5. Flush beams simplify the installation of electrical, plumbing, and heating services.
6. The dead air spaces within the slab provide improved acoustical and thermal insulation qualities.
7. Voided slabs have less deflection – with greater ease of cantilevering.
8. Fireproof construction – 3 hr. fire rating, with no additional fireproofing necessary.
9. Faster construction – larger areas can be formed and poured at one time because less concrete is required per square foot.

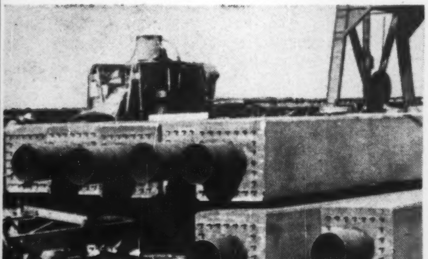
Bridge Decks. Voids in bridge deck slabs, either precast or cast-in-place, mean reduced weight and savings in concrete, steel, and supporting members. Voided slabs are especially economical for spans 30 to 70 feet.

Voided Piles. The use of Sonovoid Fibre Tubes to form voids in precast, prestressed piles reduces the amount of concrete and steel required without impairing structural strength. The resulting lighter weight pile is more easily handled and can be driven with lighter equipment.
Example: A 21″ x 21″ x 100′ solid concrete pile weighs 45,900 lbs. A pile of the same size, length (and strength), voided with a 12″ O.D. Sonovoid, weighs only 34,200 lbs.

End Closures. End closures for Sonovoid Fibre Tubes can be made of wood on the job or obtained from the manufacturer in either metal or hardboard.

Types and Availability. Type "A" Sonovoid Fibre Tube is constructed with a special weather-resistant ply, for use in cast-in-place construction in exposed areas. Type "B" Sonovoid Fibre Tube is designed for use where complete protection is afforded during storage and use.

Sonovoid Fibre Tubes are immediately available from distributors coast-to-coast in sizes from 2.25″ to 36.9″ O.D., standard 18′ lengths or as required.



For complete information on SONOTUBE Fibre Forms and SONOVOID Fibre Tubes, see our catalog in Sweet's or write

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CIRCLE 223 ON READER SERVICE CARD

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***PVC is Plastic**

(Continued from page 221)

N. Y., mech. engrs. Di Stasio & Van Buren, 136 Liberty St., New York 6, N. Y., struct. engrs. CD 1/23/61. To go ahead this summer.

▲ **N. J., Palisades Park**—Michael Pollotta, 261 First Ave., three 14 to 20 story APARTMENTS, Palisade Blvd. **$20,000,000.**

▲ **N. J., Paterson**—Joseph Rosenblatt, 9-20 12th St., Fair Lawn, GARDEN APARTMENTS, Redwood and Chamberlin Aves. **$3,000,000.**

N. J., South Amboy—Benlap Homes, c/o Jas. Harrigan Inc., U.S. Hy., 9, Sayreville, 31 HOUSES, off Sixth St. **$750,000.**

N. Y., New York—New York Jai-Alai Corp., c/o Guterman Assocs., 2 E. Mill Dr., Great Neck, plans by M. Martin Elkind, 74-09 37 Ave., Jackson Heights, rein.-con. covered by 60 ft. glass dome Fronton JAI-ALAI CENTER, parking area and spectator stands, 5 acre site 233 St. and Provost Ave., Bronx Boro. **$750,000.**

▲ **N. Y., New York**—200 East Realty Corp., 26 Broadway, Zone 4, plans by John M. Kokkins, 420 Lexington Ave., Zone 17, 16 story APARTMENT, 200 E 62nd. St., S.E.C. 3rd Ave. **$2,200,000.** Farkas & Barron, 5 Beckman St., Zone 38, structural engrs.

▲ **N. Y., North Tonowanda**—DeGraff Memorial Hospital, constr HOSPITAL ADDN. **$1,500,000.**

▲ **O., Columbus**—Lutheran Welfare League of Central Ohio, 105 S. Gift St., Lutheran Senior City HOME. **$2,000,000.**

▲ **O., Huron**—Mirheath Development Co., c/o William M. Barrett, 1633 Broadway, Lorain, 71 HOMES, Lake Rd., east edge of Huron. **$1,000,000.**

▲ **O., Kettering**—Catholic Diocese of Cincinnati, Chancery, Archbishop Alter HIGH SCHOOL, Ackerman Blvd. **Over** $1,000,000.

▲ **O., Lorain**—Stratford House, Inc., c/o Sol Friedman, 4247 Catalpa Dr., Dayton, 11 story precast concrete MOTOR HOTEL, 330-334 West First St. **$3,250,000.**

▲ **O., Middleburg Heights**—Heidi Homes, Inc., 25698 Yeoman Dr., Westlake, 50 HOMES, off Big Creek Parkway, **$1,250,000.**

▲ **O., Sandusky**—Horizons Unlimited, Inc., c/o Warren Johnson, Milan, 140 room HOTEL and MARINA, west of Battery Park. **$1,500,000.**

O., South Euclid (Dr. Cleveland) — Council Gardens, Inc., c/o Joseph S. Silber, Leader Bldg., Cleveland, Zone 14, plans by Weinberg & Teare, Citizens Bldg., Cleveland, Zone 14, 60 unit Senior Citizens RESIDENCE. **$750,000.** CD 12/8/60.

▲ **Ore., Portland**—Providence Hospital, 700 NE 47th Ave., plans by Skidmore, Owings & Merrill, 204 SW Jefferson St., HOSPITAL ADDN. **$5,500,000.** Bids Fall 1961.

▲ **Pa., Fogelsville**—Pennsylvania Power & Light Co., Allentown, OFFICE, 217 acres. Over **$2,500,000.**

▲ **Pa., New Kensington**—E. J. DeBartolo & Assocs., 7620 Market St., Youngstown, O., 150,000 sq. ft. SHOP CENTER, Lower Burrell, **$2,500,000.**

▲ **Pa., Phila.**—Owner, c/o J. J. Sanderfield, Wynnebrook Nursing Home, Ford and Cranston Rds., plans by Evantash & Friedman, 225 S. 15th St., 300 unit APARTMENT, swimming pool and parking lot, Ford and Cranston Rds. **$5,000,000.** Seymour W. Greenberg, 2031 Arch St., consult. engr.

▲ **S. C., Greenville**—Wade Hampton Shopping Center, Inc., 417 E. North St., plans by Townes & Murphy, North Gardens Bldg., 128,000 sq. ft. SHOPPING CENTER, **$1,250,000.** Raymond Gauger, Campbell Bldg., Augusta, Ga., structural engr. J. S. Holliday & Jimmy Smith, Campbell Bldg., mechanical engrs. CD 2/9/60.

▲ **Tex., Granl Prairie**—Grand Central Shopping Center, c/o Vernon & Jas. Smith, 2151 Fort Worth Ave., Dallas, plans by Howard, Decker, 5008 Greenville Ave., Dallas, 92,500 sq. ft., masonry SHOPPING CENTER, 9 acres, corner Hy. 80 and 19th Sts. **$1,200,000.**

Tex., Houston—J. Fletcher Reed & Chas. F. Reed, Jr., 2910 Westheimer, COUNTRY CLUB and HOUSING, INFIRMARY for aged, **$750,000.**

▲ **Tex., Houston**—Owner, c/o Jas. T. Swanson, Jr., 3110 Eastside St., 12 story, bsmnt., 170,000 sq. ft., masonry OFFICE, SW Houston. **$2,250,000.**

▲ **Tex., San Antonio**—Pioneer Casualty Co., 228 E. Martin St., plans by Noonan & Krocker, archts.-consult. engrs., 2002 N. St. Mary's St., 12 to 13 story, bsmnt. OFFICE, **$1,000,000.** Oscar W. Schuchart, 3360 Fredericksburg Rd., consult. engr. CD 1/6/61.

▲ **Tex., Victoria** — Troy Bennett, Victoria, 400 room HOTEL-MOTEL, at Swan Point, 19 miles, **$1,450,000.**
3,200 ft. PAVED AIRSTRIP, **$150,000.**
GOLF COURSE, **$115,000.**
2 CLUBS, swimming pool, **$750,000.**
MARINA-RESORT, **$450,000.**
2,000 BOAT STORAGE BERTHS, **$500,000.**

▲ **Tex., Wichita Falls**—Lincoln Enterprise, 2504 9th St. 200,000 sq. ft., masonry SHOPPING CENTER, **$2,500,000;** hard-paved open and closed PARKING CENTER, **$225,000.** R. C. Stanford, c/o owner, consult. engr. Bids summer 1961.

▲ **Vt., Plainfield** — Goddard College, Plainfield, plans by Hoover & Hill Assoc., 16 Eliot St., Cambridge, Mass., 14 DORMITORIES. **$2,000,000.**

▲ **Wis., Appleton**—More-Way Discount Dept. Store 10130 West Appleton Ave., Mulwaukee, plans by R. P. Blake, 4177 North Oakland Ave., Milwaukee, DEPARTMENT STORE. **$1,000,000.**

▲ **Wis., Brookfield**—Consolidated Bowling Corp., 525 North Milwaukee St., Milwaukee, Zone 2, BOWLING CENTER. **$1,250,000.**

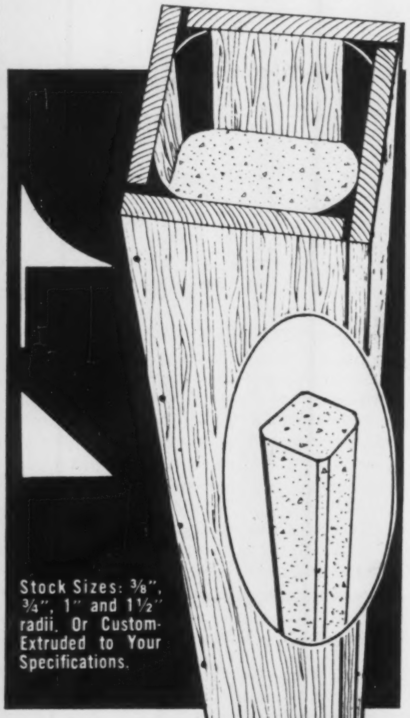
(Continued on page 229)

SPECIFY OUR

Ekonomy-FORMER®

PVC* CHAMFER-STRIP

For the swift, efficient formation of smooth, rounded corners for poured concrete in your construction jobs.



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CIRCLE 60 ON READER SERVICE CARD

103
105
106

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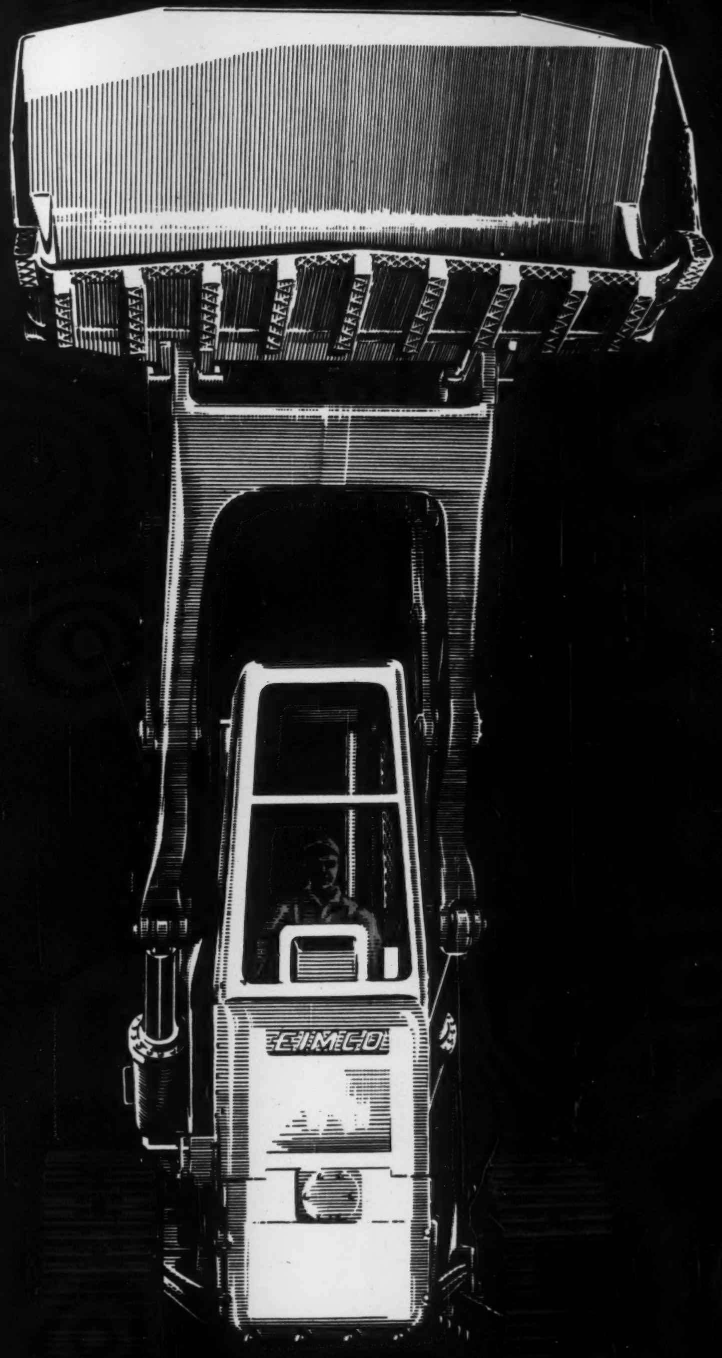
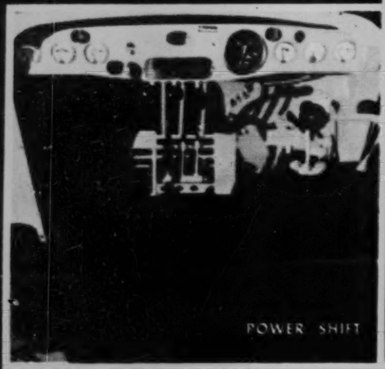
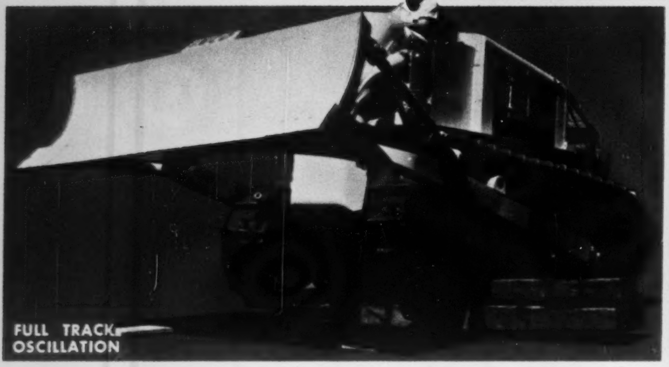



POWER SHIFT

FORWARD – ● – FORWARD
NEUTRAL – – NEUTRAL
REVERSE – ● – REVERSE
INDEPENDENT TRACK OPERATION

TRUE COCKPIT VISIBILITY


FULL TRACK OSCILLATION

Power Shift

Eimco's patented, unique "Unidrive" transmission lets you shift from one speed to another, forward or reverse, at any engine or tractor speed or load. Features gears that never reverse rotation! Heavy duty single stage torque converter standard equipment.

Independent Track Operation

Eimco's patented Dual Final Drives give you "flip-of-the-lever" control over each individual track for true spin, as well as normal brake, turns.

Full Track Oscillation

Eimco's patented alloy-steel equalizer bar permits full track oscillation, even with attachments, for greater stability and safety.

True Cockpit Visibility

Eimco's exclusive up-front operator position means the operator can see his work as he approaches it for greater control, safety and work output with no stretch, squint, squirm . . . less operator fatigue.

Anti-Friction Bearings

In every track roller and idler . . . each bearing in separate cage to maintain accuracy, longer life, and ease of maintenance.

Power Take-Off

Standard SAE specifications for take-off and drilling. Shaft runs continuously and is not affected by track operation.

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WHAT OTHERS

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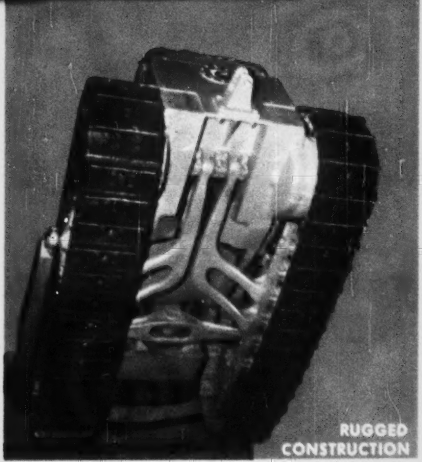
A Full One-year Warranty Against Any Defects in Workmanship and Material on every Eimco Tractor, Tractor Unit and Transmission!

Tractors • Dozers • Excavators
Front End Loaders • Log Loaders

Special Steel Mill Excavators
and Front End Loaders


RUGGED CONSTRUCTION

105 EXCAVATOR

103 DOZER

115 STEEL MILL EXCAVATOR

148 LOG LOADER

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70% SAVINGS IN MAINTENANCE COSTS!

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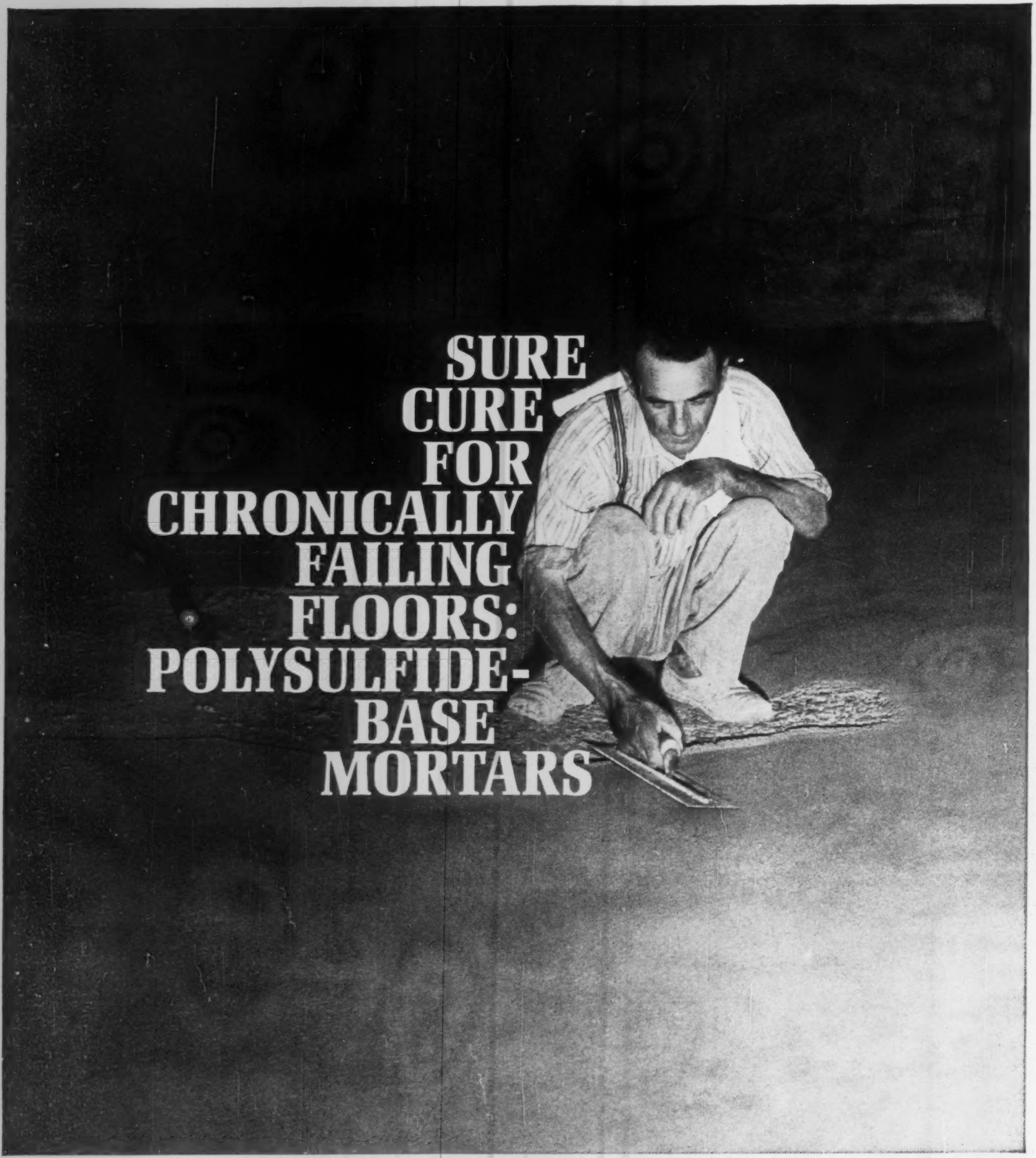

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THIOKOL polysulfide polymer is synthetic rubber in liquid form. It is famous for spectacular adhesion, elasticity, and resistance to oils, solvents, acids, chemicals, water and temperature extremes. As a mortar base with epoxy, it stands up to heavy traffic, abrasion, chemical attack like no other flooring compound. It can be applied over existing surfaces regardless of their composition, and has proven its serviceability in scores of installations.

Polysulfide-base mortars provide a smooth or skidproof surface, as desired—are ready for traffic in less than one day—and last for years under abusive wear and exposure to disintegrating elements. For full information, write to Thiokol Chemical Corporation at address below, for Brochure FC-100.

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Dominion Rubber Company, Elmira, Ontario

←CIRCLE 227 ON READER SERVICE CARD

CIRCLE 228 ON READER SERVICE CARD

(Continued from page 224)

▲ **Wis., Milwaukee**—St. Luke Hospital, 2900 W. Oklahoma Ave., plans by Schmidt, Garden & Erikson, 104 S. Michigan Ave., Chicago, Ill., HOSPITAL ADDN. 1st phase $8,000,000, Total **$19,000,000.** Bids 1962.

▲ **B. C., Vancouver**—A. H. Clary & Assocs., 1836 Kingsway, Burnaby, plans by Dirassar & James, 615, W. Hastings, HOTEL. **$1,000,000.**

▲ **Ont., Timmins**—Summerset Investments Ltd., 837 Ehlinton Ave. West, Toronto, plans by Embacher, Kulynych & Richards, 4901 Yonge St., Toronto, air-conditioned SHOPPING CENTER. **$1,000,000.**

▲ **Ont., Toronto**—The T. Eaton Co. Ltd., 190 Yonge St., Toronto, DEPARTMENT STORE, YORKDALE SHOPPING CENTER, **$1,000,000-$2,000,000.** Bids during 1961.

▲ **Ont., Toronto**—Rosepark Apartments, Ltd., Room 1028, 67 Yonge St., plans by Bregman & Hamann, 146 Bloor St. W., 9 story, rein.-con. APARTMENT, Howard St. **$1,200,000.**

▲ **Ont., Toronto**—The Royal Bank of Canada, 360 St. James St. W., Montreal, Que., plans by Marani, Morris & Allan, 1250 Bay St., BANK HEADQUARTERS BLDG., King St. E. Over **$1,000,000.** Constr. to begin early 1962. CD 6/8/55.

▲ **Que., Quebec City**—Mutuelle des Employes Civils, Grand Allee, OFFICE, Lachevrotiere and Amable Sts. **$2,000,000.**

INDUSTRIAL BUILDINGS

▲ **Conn., Versailles**—Federal Paper Board Co., Inc., 24 River Rd., Bogota, N. J., MFG. PLANT. **$5,000,000.**

▲ **Del., Claymont**—Air Reduction Co., Inc., 150 E. 42 St., New York 17, N. Y., Air Separation PLANT. **$5,000,000.**

Fla., Miami—Air Control Products, Inc., 3601 N.W. 54th St., plans by Colin Arnold, archt.-engr., 1896 N.W. 21st St., 2 story, 400 x 225 and 161 x 66 CB-S MFG. PLANT, Ipco Rd. and Miami Gardens Rd. **$750,000.**

▲ **La., Baton Rouge**—Ethyl Corp., Louisiana National Bank Bldg., two 5 story CHEMICAL PLANT RECONSTR. **$2,000,000.**

▲ **La., Franklinton**—The Houston Co., First Federal Bank Bldg., St. Petersburg, Fla., NATURAL GAS COMPRESSOR STATION. **$1,000,000.**

▲ **Mass., South Boston**—Gillette Safety Razor Co., Gillette Park, 1 story, steel frame PLANT OFFICE, SHIPPING and RECEIVING BLDGS, along Fort Point Channel, Total est. **$6,000,000-$7,000,000.** Ganteaume & McMullen, 99 Chauncy St., Boston, consult. engrs. CD 8/15/60.

Neb., Omaha—Skinner Mfg. Co., 1323 Jackson St., plans by Steele, Sandham & Weinstein, 252 Aquila Court, 86,000 sq. ft., MACARONI MANUFACTURING PLANT, 69th and F Sts. **$750,000.** **Nance Engineering, Inc.**, 1512 Davenport St., consult. engr.

N. J., Dayton—International Business Machines, 590 Madison Ave., New York 22, N. Y., 23,000 sq. ft. OFFICE (for Supplies Division), Dayton-Monmouth Junction Rd. **$750,000.**

▲ **N. Y., Island Park**—Long Island Lighting Co., 250 Old Country Rd., Mineola, Unit No. 2, 185,000 KW GENERATING UNIT at existing plant, E. F. Barret Power Station. **$30,000,000-$40,000,000.** Constr. 1963.

▲ **Pa., Phila.**—Charles E. Hires Co., 206 S. 24th St., Phila., PLANT. Over **$1,000,000.**

▲ **Tex., Borger**—Phillips Petroleum Co., Bartlesville, Okla., reconstr. REFRACTIONATOR REFINERY. **$3,500,000.** CD 8/25/60.

▲ **Tex., Corpus Christi**—Owner, c/o Morris L. Levy, archt., Kaffie Bldg., 4 story, bsmnt., 240,000 sq. ft., concrete MEAT PACKING PLANT, Phase 1, FEED and STOCK PENS, Phase 2, north side of Tule Ship Channel. **$1,450,000.** Bids late 1961.

▲ **Tex., Deer Park**—Diamond Alkali Co., Deer Park AMMONIA PLANT, **$5,000,000.** Bids May or June 1961. CD 12/10/57.

▲ **Wash., Seattle**—General Electric Co., 1485 Bayshore Blvd., San Francisco, Calif., plans by Bindon & Wright, Norton Bldg., 122,400 sq. ft., APPLIANCE DISTRIBUTION CENTER, on rein.-con. foundation, in Andover Industrial Park at Tukivla, **$1,000,000.** Bids 4/15/61. CD 1/26/61.

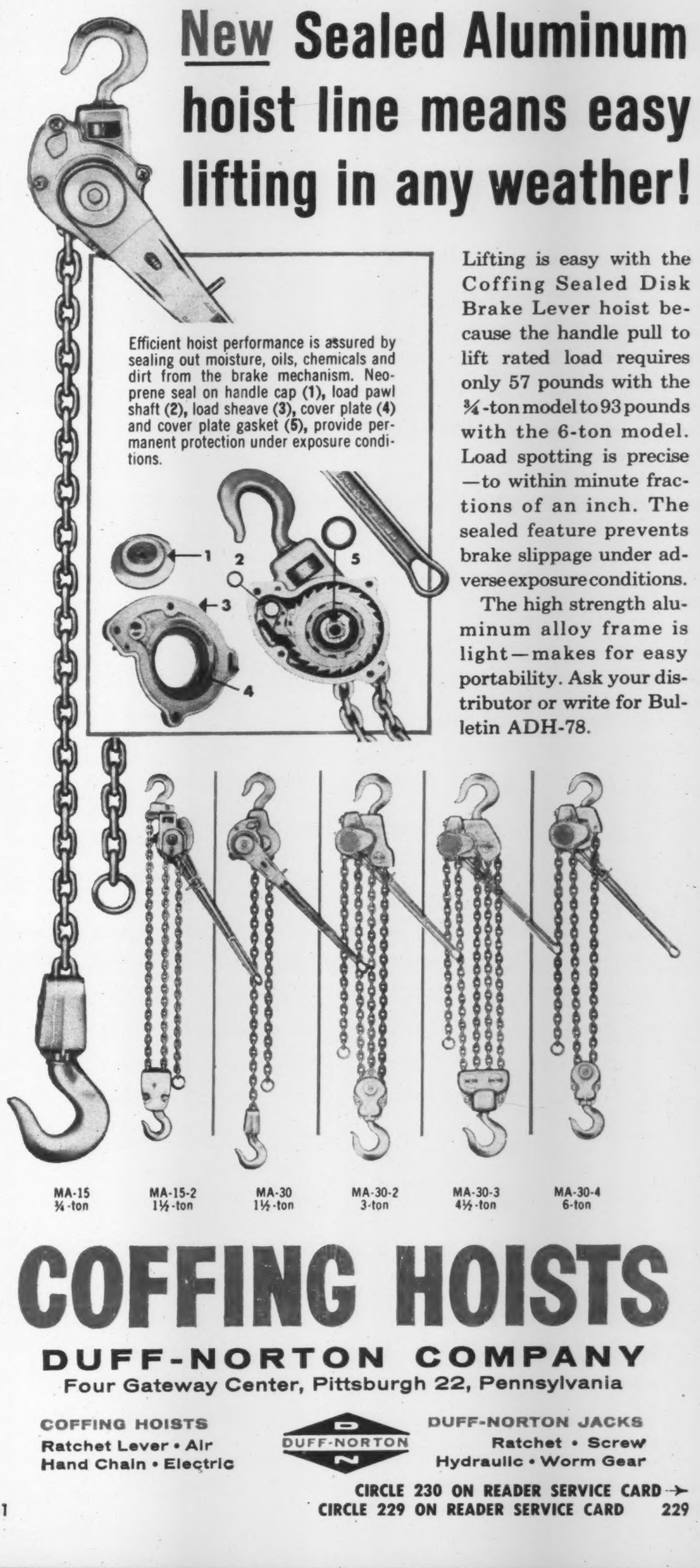
▲ **Wis., Milwaukee**—Ambrosia Chocolate Co., 528 West Highland Ave., FACTORY-OFFICE ADDN. **$2,000,000.** Chas. Nagel & Assocs., 1615 Underwood Ave., Wauwatosa, Zone 13, consult. engrs.

AMERICANS ABROAD

▲ **India, New Delhi**—Dpt. State, Foreign Bldgs., 21 St. and Virginia Ave. N. W., Wash., D. C., U. S. A., plans by McLeod & Ferrara, 1223 Connecticut Ave. N. W., Wash., D. C., U. S. A. and Edward Stone, 50 E. 64 St., New York 21, N. Y., U S A. New Delhi EMBASSY ADDN. **$1,000,000.**

▲ **India, Visagapatam**—California Chemical Co., subsidiary Standard Oil Co. of California, 225 Bush St., San Francisco, Calif., U. S. A. International Minerals & Chemical Corp., 5401 Old Orchard St., Skokie, Ill. U. S. A., and E. I. D. Parry Group, Madras, India, FERTILIZER PLANT. **$51,000,000.**

▲ **Pakistan, Karachi**—Intercontinental Hotels Corp., 135 E. 42 St., New York, N. Y., U.S.A., and Pakistan International Air Lines, Karachi, plans by William Tabler, 401 7 Ave., New York 1, N. Y., U.S.A., air-conditioned HOTEL, Clifton Area. **$7,000,000.** CD 2/27/61.



New Sealed Aluminum hoist line means easy lifting in any weather!

Efficient hoist performance is assured by sealing out moisture, oils, chemicals and dirt from the brake mechanism. Neoprene seal on handle cap (1), load pawl shaft (2), load sheave (3), cover plate (4) and cover plate gasket (5), provide permanent protection under exposure conditions.

Lifting is easy with the Coffing Sealed Disk Brake Lever hoist because the handle pull to lift rated load requires only 57 pounds with the ¾-ton model to 93 pounds with the 6-ton model. Load spotting is precise—to within minute fractions of an inch. The sealed feature prevents brake slippage under adverse exposure conditions.

The high strength aluminum alloy frame is light—makes for easy portability. Ask your distributor or write for Bulletin ADH-78.

COFFING HOISTS

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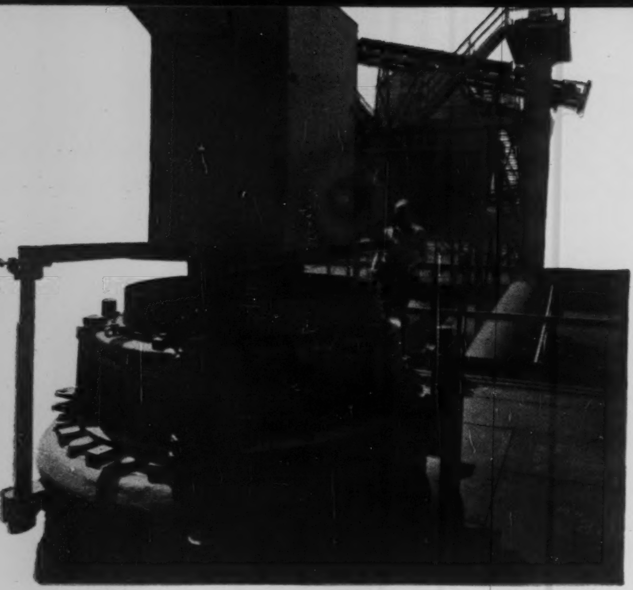
CIRCLE 230 ON READER SERVICE CARD →
CIRCLE 229 ON READER SERVICE CARD

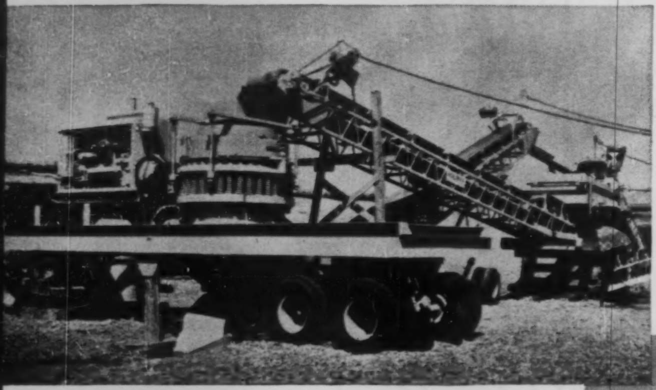


FOR REDUCTION CRUSHING

Symons® Cone Crushers are built in both Standard and Short Head types, in sizes from 22″ to 10′ in diameter. Capacities to 1500 or more tons per hour.

Illustrated is one of many Symons Cones used for the profitable, big tonnage crushing of slag.

Assure profitable production of Aggregates, Crushed



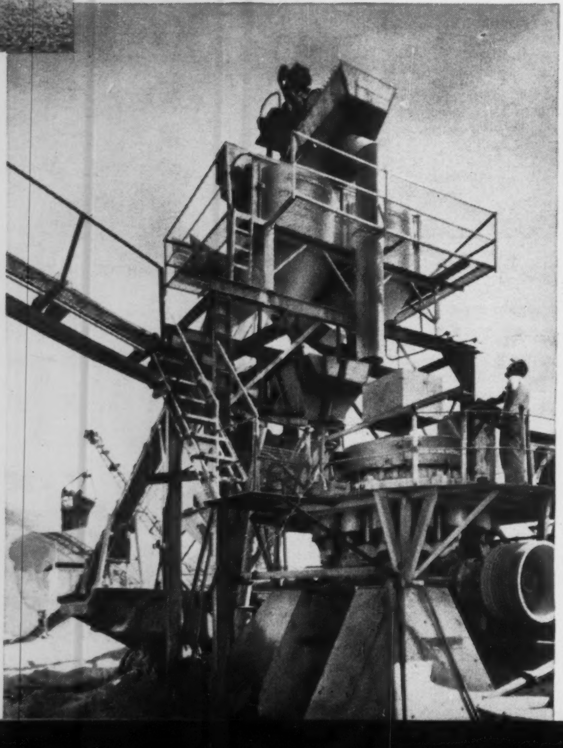
FOR PORTABLE PLANT SERVICE

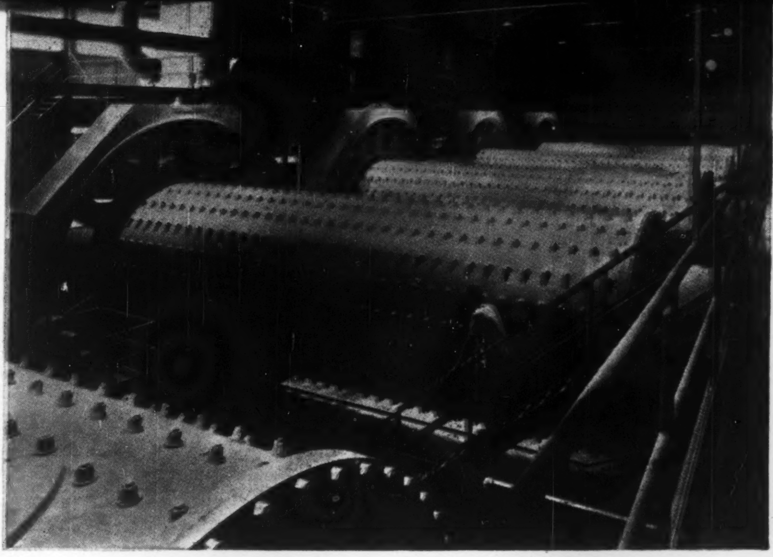
Increasing numbers of portable plants are built using Symons Cone Crushers for big capacity of fine product . . . such as the portable crushing plant at left, which utilizes a 4′ Symons Cone Crusher and a Symons Horizontal Vibrating Screen.

FOR SCREENING

From scalping to fine screening, there is a Symons Screen built to do the job at low cost. In the illustration at right, two Symons V-Screens® are used in conjunction with a 54″ Gyradisc® Crusher* to handle a daily production of up to 500 tpd of manufactured sand and a filter medium . . . both "premium" products made from previously unsalable torpedo gravel.

*Gyradisc Crushers are used for volume production of fine specification material often supplanting the need for comminution by grinding mills.





FOR WET AND DRY GRINDING

Nordberg Grinding Mills include Rod, Ball, Pebble, Tube and Compartment types, in sizes up to 13′ in diameter and up to 50′ in length.

Shown at left are five 12′ x 36′ Nordberg Mills installed in a 5 million bbl. per year wet process cement plant in Michigan. These are the largest grinding mills ever built.

Sand and Cement with NORDBERG MACHINERY

FOR PYRO-PROCESSING

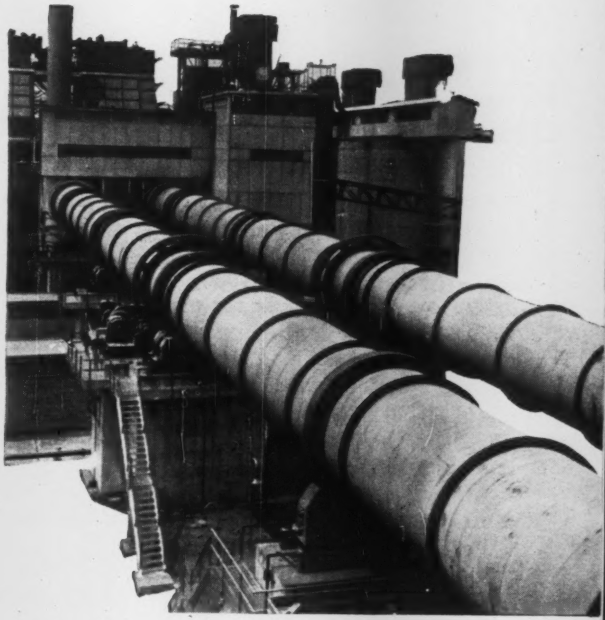
Nordberg Rotary Kilns and Dryers for pyro-processing and calcining cement, lime and other materials, are manufactured in various diameters and lengths to meet specific requirements.

The two Nordberg Kilns at right are 11′ x 360′ units, serving a midwestern cement manufacturer.

FOR POWER GENERATION

Nordberg two and four cycle engines are built in sizes from small 10 horsepower units to over 12,000 horsepower in a single engine . . . for Diesel, Duafuel® and Spark-Ignition Gas operation.

Below is a 4425 bhp, 3150 kw Nordberg Engine installed in a large Texas cement plant.



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AND STILL THE CHAMP!

The BUTLER TX-4 Roadbuilders Plant

World's Records for highway batching were made with the BUTLER TX-4 in 1958, 6,029 lineal feet; in August, 1960, 7,250 feet; and again in the same month, 8,036 feet. All laying slab 24 ft. wide and 9 inches thick. And all by Denton Construction Co., Michigan.

That's mighty conclusive proof of the profit-making superiority of BUTLER Automation. The TX-4 can be completely actuated by the truck drivers themselves, or if required, by only one operator.

And the TX-4 is so scientifically accurate, so completely error-proof and trouble-free it *could* act as its own inspector.

Perhaps you don't need such a high-level of production. The TX-4 will exactly match your batching needs for one, two, three, four (or more) pavers. It's just a matter of the number of batchers for your contract requirements.

The Most Portable of All...

All components—bins, batchers and structural members are unitized for easy handling and transport. All wiring and piping are in place, ready for instant hook up. You'll want a complete description to know how the TX-4 will fit perfectly into your jobs, so send for the new TX-4 bulletin now — and get ready for a bigger profit this year.

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3192

CONSTRUCTION REPORTS
Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—LB & CA

▲ **MASSACHUSETTS**—Commonwealth Mass., Dpt., P. Wks., 100 Nashua St., Boston, ROAD,
George Brox, Inc., 1454 Methuen St., Dracut, Mass., CA **$1,209,715**, wid'n section Rte. 128. U-272(48), Woburn. BA 1/24, CA 3/8. CD 1/26/61, under LB.

BUILDINGS—LB & CA

▲ **Fontaine Bros., Inc.**, 40 Hendrick St., Chicopee Falls, Mass., CA **$1,716,000**, PHA Mass-5-5 and 5-4, 150 unit HOUSING, three sites, HOLYOKE, MASS. City Housing Auth., Administration Bldg., Jackson Parkway, Holyoke, Mass. BA 2/2. CA 3/10. CD 2/8/61, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲† **Pennsylvania**—BA 3/28—U. S .Eng., 2635 Abbottsford Rd., Phila., LEVEES, FLOODWALLS, and PUMPING STATIONS, Lehigh River, ENG-36-109-61-10. $4,000,000. Plans deposit $10. CD 12/12/61, under LB.

▲ **N. Y., Leroy**—BA 4/10—Village, Village Hall, 3 West Main St., SEWAGE TREATMENT PLANT and 68,000 ft. 8- to 15-in. SANITARY SYS., STREET and TRUNK SEWERS. $2,150,000. Plans deposit $20. Wm. S. Lozier & Co., 10 Gibbs St., Rochester, engrs. CD 10/7/60.

BUILDINGS—BA

▲ **Md., College Park**—BA 4/4—Maryland University, STUDENT UNION BLDG. ADDN. $1,500,000. Plans deposit $100. Walton & Maddon, 3510 Rhode Island Ave., Mount Ranier, archts. CD 10/22/59.

▲ **N. Y., Buffalo**—BA 4/6—University of Buffalo, Main St., STUDENT UNION. $3,000,000 Plans deposit $50. Duane Lyman & Assoc., 505 Delaware Ave., Zone 2, archts. CD 6/28/60.

▲ **N. J., Union**—BA 4/11—State Treas., State House, Trenton, DORMITORY on campus Morris and Conant Ave., Newark State College. **$1,218,000**. Scrimenti, Swackhamer & Perantoni, 205 West Main St., Somerville, archts. CD 12/3/59.

▲ **Pa., Ambler**—BA 4/13—Ambler-Lower Gwynedd-Whitpain Joint School System, Ambler, Wissohickon SENIOR HIGH SCHOOL. $2,500,000. Plans deposit $100. Buchart Assocs., 611 W. Market St., York, archts. CD 3/9/61.

▲ **N. Y., Stony Brook**—BA 4/19—State Dpt. P. Wks., State Office Bldg., Albany, LIBRARY; PHYSICS BLDG.; BIOLOGY BLDG., State University College on Long Island Voorhees, Walker, Smith, Smith & Haines, 101 Park Ave., New York, N. Y., archts. CD 3/26/57.

HEAVY CONSTRUCTION—LB & CA

Layne New York Co., New Albany Rd., Moorestown, N. J., CA **$740,000**, ARTESIAN WELL, MOORESTOWN, N. J. Moorestown Twp. Comrs., Town Hall, Moorestown, N. J. Harry B. Bowman, 512 Camden Ave., Moorestown, N. J., engr.

▲ **Gunnell Constr. Co., Inc.**, Tower Bldg., Wash., D. C., LB **$1,272,557** (6 bidders), North Capital St improvements, GRADE SEPARATION at New York Ave., and incidental work Pierce St. to P St., WASH., D. C. D. C. Govt., Dpt. Hys., 499 Pennsylvania Ave. N.W., Wash., D. C. BA 3/13/61. CD 3/8/61.

BUILDINGS—LB & CA

▲ **Stone Road Apartments, Inc.**, Greece, N. Y., Owner Builds, **$3,000,000**, 128 unit APARTMENT and MEDICAL CENTER, Stoneridge Plaza, GREECE (BR. ROCHESTER), N. Y. Morrison & Morrison, 455 Lake Ave., Rochester, N. Y., archts.

▲ **Mars Associates, Inc. & Normel Constr. Corp.**, 271 Church St., New York 13, N. Y., LB **$1,606,000**, general contract PUBLIC SCHOOL 29, Courtlandt Ave. between E.156 and 157 Sts., Bronx Boro, NEW YORK, N. Y. Deputy Supt. Schools, Bureau Constr., 42-15 Crescent St., Long Island City, N. Y. BA 3/14 CD 2/20/61.

▲ **J. P. Blitz, Inc.**, 545 Madison Ave., New York 22, N. Y., LB **$7,174,600**, Contrs. 5 and 6 fdns. and general contract John Adams HOUSES, Proj. NY-5-49, E.156 St., Union Ave., E.162 St. and Westchester Ave., Bronx Boro, NEW YORK, N. Y. New York City Housing Auth., 299 Broadway, New York 7, N. Y. BA 3/14, CD 3/8/61;
H. Sands & Co., Inc., 11 Park Pl., New York 7, N. Y., LB **$772,400**, Contr. 7, heating and ventilating John Adams Houses (New York, N. Y.);
Simpson Electric Corp., 1857 2nd Ave., New York, N. Y., LB **$777,600**, Contr. 8, electrical work John John Adams Houses (New York, N. Y.);
Seaberg Elevator Co., 243 44 St., Brooklyn, N. Y., LB **$503,396**, Contr. 8, elevators, John Adams Houses, (New York, N. Y.);
Abraham Newmeyer, 106 St. and F.D.R. Dr., New York, N. Y., LB **$1,121,350**, Contr. 9, plumbing, John Adams Houses (New York, N. Y.).

▲ **Owners**, c/o Elliot M. Weiner and Benjamin Harris, archts., 500 Broadway, Newburgh, N. Y.. Alwin

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CIRCLE 61 ON READER SERVICE CARD

Cassens, Jr., archt., 145 S. Franklin Ave., Valley Stream, N. Y., and Herman York, archt., 90-04 161 St., Jamaica 32, N. Y., Owner Builds, **$4,000,000**, 200 HOMES, Laurel Ridge Area, STERLING FOREST, N. Y. CD 2/6/61.

▲ **H. & H Constr. Co.**, 2113 Federal St., Camden, N. J., Owner Builds, **$1,400,000**, 200-unit RESIDENTIAL DEVELOPMENT, Hammond Heights area, GLASSBORO, N. J. Dante J. D'Anastasio, 1815 Federal St., Camden, N. J., archt.

▲ **Cornell Development Co.**, 225 Way Dr., Cinnaminson, N. J., Owner Builds, **$2,000,000**, 139 unit RESIDENTIAL DEVELOPMENT, Moorestown-Riverton Rd., etc., RIVERTON, N. J.

▲ **C. William Huber**, Media, Pa., Owner Builds, **$1,840,000**, RESIDENTIAL DEVELOPMENT, 92 Duplex Homes, Maryland Ave., etc., ALDAN, PA.

▲ **Sutton Garden Apts.**, 403 Rockland Ave., Merion, Pa., Owner Builds, **$2,000,000**, 250 units Garden Type APARTMENT, Mac Dade Blvd., FOLSOM, PA. Henry S. Berg, 1411 Walnut St., Phila., Pa., archt.

▲ **Huber, Hunt & Nichols, Inc.**, P. O. Box 128, 2450 S. Tibbs Ave., Indianapolis, Ind., CA **$30,000,000**, 800,000 sq. ft. Valley Forge SPACE TECHNOLOGY CENTER, KING OF PRUSSIA, PA. General Electric Co., 361 River Rd., Schenectady, N. Y. Vincent G. Kling, 915 Corinthian Ave., Phila., Pa., archt. United Engineers & Constructors, Inc., 1401 Arch St., Phila., Pa., engr. CD 1/13/61, under LB.

▲† **General Services Admin.**, 250 Hudson St., New York City, N. Y., rejected bids Jan. 31, COURT HOUSE ADDN., PHILA., PA. **$5,735,000.** CD 2/2/61, under LB.

▲ **Glassman Constr. Co.**, 2001 Wisconsin Ave. N.W., Wash., D. C., CA **$1,522,000**, Nicholas Orem JUNIOR HIGH SCHOOL, Boswell Tract, West Hyattsville, MARLBORO, MD. Prince Georges County Bd. Educ., Marlboro, Md. BA 3/13. CD 3/15/61, under LB.

▲ **Burkey Constr. Co.**, P.O. Box 3218, Reading, Pa., LB **$3,000,000**, PLANT-OFFICE, parking area, READING, PA. Greater Berks Development Fund, 52 N. 4th St., Phila., Pa. Greater Berks Associated Architects, c/o William Ostermayer, 5th and Walnut Sts., Reading, Pa., archts. Kneas & Long, 504 Woodland Terrace, Phila., Pa., engrs. Western Electric Co., lessee. BA 11/1/59. CD 9/29/59.

▲ **Glassman Constr. Co.**, 2001 Wisconsin Ave. N.W., Wash., D. C., LB **$1,522,000**, (6 bidders), Nicholas Orem JUNIOR HIGH SCHOOL, Boswell Tract, West Hyattsville, MARLSBORO, MD. Prince Georges County Bd. Educ., Marlboro, Md. BA 3/13. CD 3/6/61.

SOUTH

HEAVY CONSTRUCTION—BA

▲† **Kentucky and Tennessee**—BA 4/12—U. S. Eng., P. O. Box 1070, Nashville 2, Tenn., right bank COFFERDAM and EXCAVATION, Barkley Dam Proj., Lyon Co., CIVENG 40-058-61-18. $1,500,000. Plans deposit $10. CD 3/15/61.

BUILDINGS—BA

▲ **Ky., Independence**—BA 4/6—Kenton Co. Bd. Educ., HIGH SCHOOL, Turkey Foot Rd., Covington. Plans deposit $75. CD 9/11/58.

▲† **Tenn., Oak Ridge**—BA On Or about 4/18—Atomic Energy Comn., Oak Ridge, PATHOLOGY and PHYSIOLOGY LABORATORIES and ANIMAL FACILITY, Bldg. 9207 Y-12 Area. Plans deposit $50. CD 9/12/58.

▲ **Va., Princess Anne**—BA 4/20—Princess Anne Co. School Bd., Princess Anne Court House, 1 story, 130,000 sq. ft. steel, masonry SOUTHSIDE JUNIOR HIGH SCHOOL. $1,500,000. Plans deposit $100. Extended date. Bernard B. Spigel, Kresge Bldg., Norfolk, archt. Vansant & Gusler, 1025 West 45th St., Norfolk, engrs. CD 3/6/61.

BUILDINGS—SLC

▲ **Ga., Chamblee**—General Services Admin., 50 7th St. N. E., Atlanta, soon lets contract build and lease 188,000 sq. ft. OFFICE, for Internal Revenue Service, $2,000,000.

HEAVY CONSTRUCTION—LB & CA

▲† **Lane Constr. Co.**, Box 911, Meriden, Conn., CA **$2,625,791**, PAVING RUNWAY, TAXIWAY and APRON, Homestead Air Force Base, ENG-08-123-61-51, HOMESTEAD, FLA. U. S. Eng., 575 Riverside Ave., Jacksonville, Fla. BA 3/8/61. CD 3/14/61, under LB.

▲ **TENNESSEE**—State Dpt. Hys., Cotton State Bldg., Nashville, ROADS,

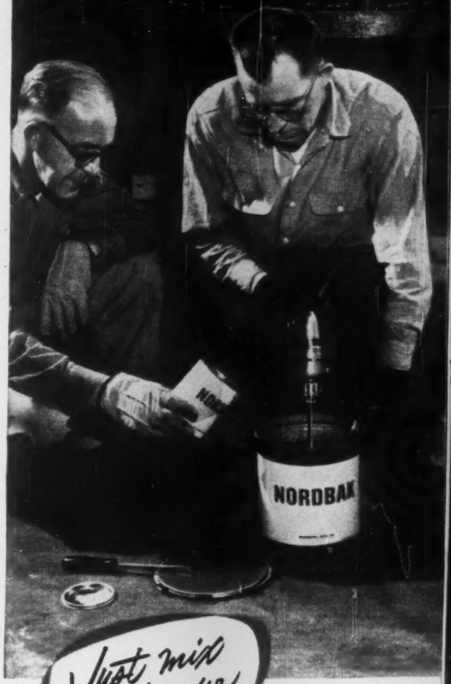
Tenn.—**Oman Constr. Co.**, Acklen Park, Nashville, Tenn., CA **$2,856,106**, grading, drainage, Interstate Hy. Constr. Proj. I-40-4-(7)209, Davidson Co.; CA **$2,618,757**, grading, drainage, Interstate Hy. Constr. Proj., I-65-3(10)84, Davidson Co.;

Tenn.—**Anderson-Gregory Co.**, Sudekum Bldg., Nashville, Tenn., CA **$570,674**, grading, drainage, Interstate Hy. Constr. I-65-2(8)52, Williamson Co.;

Tenn.—**John L. Burns, Inc.**, Donelson Pike, Donelson, Tenn., CA **$2,509,888**, grading, drainage, Interstate Hy. Constr., I-40-5(7)211, Davidson Co.;

Tenn.—**Burns & Baker**, 726 16th Ave. S., Nashville, Tenn., CA **$516,839**, grading, drainage, and surf., Hy. Constr. Proj., F-001-6(18), White Co., Grand total $9,072,264. BA 2/24/61. CD 3/2/61, under LB.

▲ **Blount Brothers Corp.**, 79 Commerce St., Montgomery, Ala., LB **$9,950,000**, est. $9,806,907, constr. PROPULSION ENGINE ALTITUDE TEST CELL, Arnold Engineering Development Center, TULLAHOMA, TENN.



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CIRCLE 233 ON READER SERVICE CARD→

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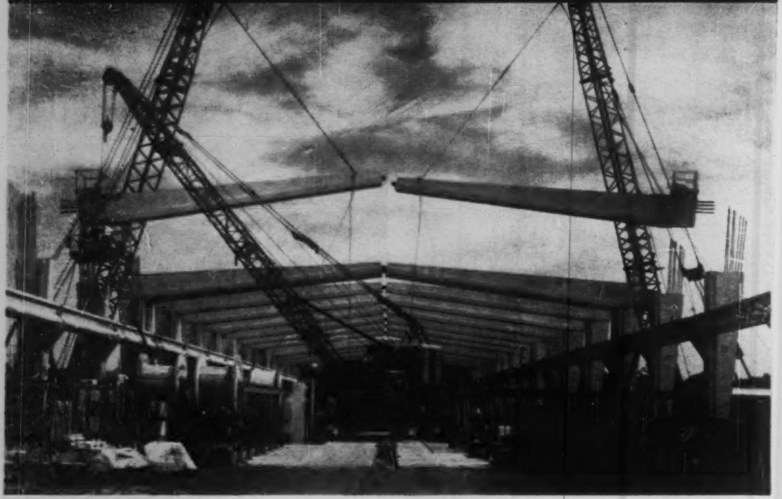

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Imaginative engineers are using STRESSTEEL Bars as the effective solution to many precast concrete problems. These high strength alloy steel bars are available in sizes up to 1¼" ∅ with recommended working stress up to 90,000 psi. Equipped with wedge or threaded anchors, STRESSTEEL Bars have been used for many unusual and special applications.

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U. S. Eng., Customs House, Nashville, Tenn. BA 3/8/61. CD 3/3/61.

BUILDINGS—LB & CA

▲ **McDevitt & Street Co.**, 145 Remount Rd., Charlotte, N. C., CA Est. **$4,000,000**, 300,000 sq. ft. MFG. PLANT, CHARLOTTE, N. C. Lance, Inc., 1300 South Blvd., Charlotte, N. C. CD 1/30/61, under LB.

▲ **M. B. Kahn Constr. Co.**, P.O. Box 595, Columbia, S. C. CA **$2,264,812**, SURGICAL GAUZE MFG. PLANT, GREENWOOD, S. C. Parke-Davis Co., Joseph Campau Ave. at River, Detroit, Mich. BA 12/15/60. CD 11/28/60.

▲† **American Bridge Division, U. S. Steel Corp.**, 700 N. 39th St., Birmingham, Ala., CA **$1,991,761**, STRUCTURAL STEEL manufactured in Pennsylvania, Widows Creek Steam Plant, ALABAMA. Tennessee Valley Authority, New Sprankles Bldg., Knoxville, Tenn. CD 10/7/57.

▲ **Kaiser Engineers Div., Henry J. Kaiser Co.**, 1924 Broadway, Oakland 12, Calif., CA Est. **$5,000,000**, TABULAR ALUMINA PLANT, BATON ROUGE, LA. Kaiser Aluminum & Chemical Corp., 300 Lakeside Dr., Oakland 12, Calif. CD 12/6/55.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲ **Ill., Zion**—BA 5/1—City, City Hall, WATERWORKS, RELIEF SEWERS, $1,650,000. H. B. Bleck Engineering, 1321 Glen Rock Ave., Waukegan, engrs. CD 2/24/61.

BUILDINGS—SLC

▲ **Ill., Chicago**—Howard F. Wallach & Jerrold Wexler, 120 S. LaSalle St., Chicago, Zone 3, soon lets contract 35 story, 248 unit APARTMENT, 1440 N. Lake Shore Dr., $8,000,000. Hirschfield, Pawlan & Reinheimer, 327 S. LaSalle St., Chicago, Zone 4, archts. CD 2/27/61.

HEAVY CONSTRUCTION—LB & CA

▲ **Arcole Midwest Corp.**, 3225 Main St., Skokie, Ill., LB **$6,317,089**, APRON and TAXIWAY, O'Hare International Airport, CHICAGO, ILL. City, City Hall, Chicago, Ill. BA 3/13. CD 2/28/61.

BUILDINGS—LB & CA

▲ **Campus Constr. Co.**, 12728 Woodland Ave., Cleveland, O. Owner Builds, **$2,000,000**, 330 HOMES, Hometown Subdivision No. 1, MENTOR, O. Hart & Weiss, 12728 Woodland Ave., Cleveland, O., archts. CD 2/24/60.

▲ **Myers Y. Cooper Co.**, 2649 Erie St., Cincinnati, O., Owner Builds, **$2,210,000**, 65-HOUSE RESIDENTIAL DEVELOPMENT, Montgomery Ave., MONTGOMERY, O. James Wald & Assocs., N. Bond Rd., Cincinnati, O., engrs. CD 10/11/55.

▲ **H. K. Ferguson Co.**, 1783 East 11th St., Cleveland, Zone 14, O., CA Est. **$2,000,000**, 250,000 sq. ft. MFG. PLANT, hydraulic power units, JOLIET, ILL. Caterpillar Tractor Co., 600 West Washington St., Peoria, Ill.

▲ **B. Perini Corp.**, 73 Mt Wayte Ave., Framingham, Mass., general contract LB **$6,980,000**, CIVIC CENTER and AUDITORIUM, MADISON, WIS. City, City Hall, Madison Wis BA 3/7/61. CD 12/21/60;
R. Maloblocki & Assocs., Inc., 205 W. Wacker Dr., Chiacgo, Ill., LB **$551,775**, piling contract for CIVIC CENTER and AUDITORIUM, (Madison, Wis.).
Pharo Heating Co., 1302 Regent St., Madison, Wis., LB **$612,950**, heating, ventilating, air-conditioning contract for CIVIC CENTER and AUDITORIUM (Madison, Wis.);
Robert J. Nickles, Inc., 303 S. Ingersoll St., Madison, Wis., LB **$659,555**, electric contract for CIVIC CENTER and AUDITORIUM (Madison, Wis);

▲ **J. H. Findorff & Son**, 601 West Wilson St., Madison, Wis., LB Est. **$1,000,000**, 1 story, 117,000 sq. ft. FACTORY-OFFICE, MIDDLETON, WIS. American Scientific Laboratory, Inc., 4001 North Sherman Ave., Madison, Wis. BA 2/23/61. CD 2/6/61.

▲ **Quasius Bros., Inc.**, 1716 North 16th St., Sheboygan, Wis., CA Est. **$2,000,000**, concrete, steel, brick FACTORY, SHEBOYGAN, WIS. Garton Toy Co., 1104 Wisconsin Ave., Sheboygan, Wis. Satre & Senescall 707 Center St., Sheboygan, Wis., archts.

▲ **S. A. Healy & Gargaro Co.**, 6561 E. Seven Mile Rd., Detroit, Mich., LB **$4,373,000**, Contrs. PW-3069 and PW-3070, Schoolcraft RELIEF SEWER SECTIONS 1 and 2, Rouge River to Hubbell Ave., DETROIT, MICH. City, 528 City-County Bldg., Detroit 26, Mich. BA 2/21. CD 1/17/61.

MISSISSIPPI TO ROCKIES

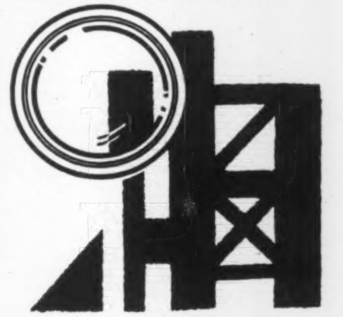
HEAVY CONSTRUCTION—BA

▲† **Oklahoma**—BA 4/11—U. S. Eng., Box 61, Tulsa, Zone 2, Area 1, Relocating 23.7 mi. Osage County ROADS, Keystone Reservoir, ENG-34-066-61-79. $1,500,000. CD 3/9/61.

▲† **Oklahoma**—BA 4/12—U. S. Eng., Box 61, Tulsa, Zone 2, relocating M K & T RAILWAY TRACKS, Sections 1 through 5, Canadian River, Eufaula Reservoir, CIVENG-34-066-61-81, $2,000,000. Plans deposit $10. CD 3/10/61.

▲† **Colo., Colorado Springs**—BA 4/25—U. S. Eng., 6012 U. S. Post Office & Courthouse, Omaha 2, Neb., NORAD EXCAVATION, ENG-25-066-61-41. $7,500,000. Parsons, Brinckerhoff, Quade & Douglass, 165 Broadway New York, N. Y., engrs. A. J. Ryan &

DOWN TO FUNDAMENTALS



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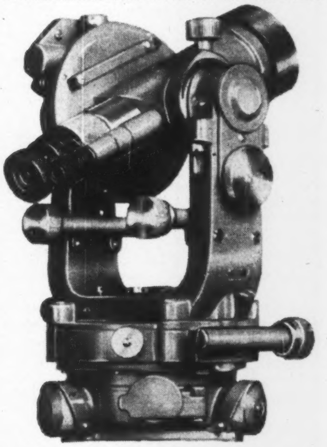

CIRCLE 62 ON READER SERVICE CARD

Assocs., 1340 Glenarm Place, Denver, Colo., assoc. engrs. CD 3/14/61.

BUILDINGS—BA

▲ **Minn., St. Paul**—BA 3/30—University of Minnesota, 404 Administration Bldg., Minneapolis, Zone 14, MARRIED STUDENTS HOUSING, Phase 3, University of Minnesota, St. Paul Campus. $1,280,000. Setter, Leach & Lindstrom, Inc., 133 Foshay Tower, Minneapolis, archt. CD 12/11/59.

▲† **N. D., Grand Forks**—BA About 4/12—Base Procurement Office, Grand Forks Air Force Base, completing 1,048 units No. 1 and No. 2 CAPEHART HOUSING, Grand Forks Air Force Base, GRAND FORKS, N. D. Base Procurement Office, Grand Forks Air Force Base, Grand Forks, N. D. CD 8/11/60, under CA.

▲ **Tex., Garland**—BA About 4/18—Dearborn Stove Co., 1700 W. Commerce St., Dallas, FACTORY and OFFICE, $1,500,000, REPAIR SHOP, $135,000. Benson & Norris, 5738 N. Central Expressway, Dallas, archts.-engrs. CD 8/24/60.

▲ **Colo., Greeley**—BA About 4/15—Colorado State College, Campus, two 5 story wings, single core women's DORMITORY. $2,000,000. R. F. Linstedt, 625 W. 14th Ave., Denver, Zone 4, archt. CD 1/9/56.

HEAVY CONSTRUCTION—LB & CA

▲ **MINNESOTA**—State Hy. Dpt., Capitol Approach, St. Paul, ROADS,

Minn.—**Woodrich Constr. Co.**, 201 18 Ave. S., Hopkins, Minn., CA **$1,411,334**, gravel base and concrete pavt. 10 mi. between Zumbrota and South County line, Goodhue Co.;

Minn.—**J. Dieseth Co.**, P.O. Box 635, Fergus Falls, Minn., CA **$785,327**, grading, gravel base and plant mixed bit. base 15.2 mi. Beltrami and Koochiching Counties. BA 2/17. CD 2/23/61, under LB.

▲† **McCarthy Bros. Constr. Co.**, 4903 Delmar Blvd., St. Louis 8, Mo., CA **$2,296,861**, 6,500 lin. ft. rein.-con. FLOODWALL, 1 road closure with steel closure gates, etc. Proj. Item F-2, Flood Protection, St. Louis. CIVENG 23-065-61-50, MISSOURI. U. S. Eng., 420 Locust St., St. Louis 2, Mo. BA 2/16. CD 2/20/61, under LB.

▲ **Hardwick-Ingram Constr. Co.**, Fourche Dam Pike, Sweet Home, Ark., LB **$1,191,637**, est. $1,300,000 (6 bidders), 42 in. high pressure WATER PIPE LINE from Lake Ellsworth to Lake Lawtonka, LAWTON, OKLA. City, City Hall, Lawton, Okla. BA 2/28/61. CD 2/14/61.

▲† **Elmer C. Gardner, Inc.**, P. O. Box 19071, Houston 24, Tex., LB **$5,378,444**, Est. $5,469,598 (7 bidders), Waco Reservoir SPILLWAY, Brazos River Basin, Bosque River, ENG-41-443-61-65, TEXAS. U. S. Eng., 100 West Vickery, Fort Worth, Tex. BA 3/15/61. CD 3/8/61.

▲ **COLORADO**—State Hy. Dpt., 4201 East Arkansas Ave., Denver, Bids opened 3/14, BRIDGES,

H-E Lowdermilk Co., 1950 W. Dartmouth Ave., Denver, Colo., LB **$3,444,934**, for steel construction, est. $3,332,000, (7 bidders), 15,000 ft. bridge over Gunnison River, Lake Fork Crossing minor structures, grading, 6.432 mi., Project CC-40-0006-26, Gunnison Co. Boduroff & Meheen, Inc., 601 S. Jason St., Denver, Colo., eng., CD 2/28/61;

A. S. Horner Constr. Co., 1118 S. Pecos St., Denver, Colo., LB **$3,882,824**, for prestressed construction, 15,000 ft. bridge over Gunnison River, Lake Fork Crossing minor structures, grading, 6.432 mi. Proj. CC-40-0006-26, (Gunnison Co.)

▲ **Robert E. McKee General Contractor, Inc.**, 933 Country Club Drive, Box 1706, Santa Fe, N. M., LB **$1,617,300**, Type 2, AIR ROUTE TRAFFIC CONTROL TOWER, ALBUQUERQUE, N. M. Federal Aviation Agency, Box 90007, Airport Station, Los Angeles, Calif. (**Correction**—status). CD 2/28/61, under CA; **Cheves Constr. Co.**, Mesa, Ariz., LB **$1,617,300**, Type 3, AIR ROUTE TRAFFIC CONTROL TOWER (Albuquerque, N. M.)

BUILDINGS—LB & CA

▲ **Big City, Inc.**, c/o Harry Jacobs, 6314 Brookside, Kansas City 13, Mo., Owner Builds, **$1,500,000**, 100,000 sq. ft. SHOPPING CENTER, 700-car parking, LEE'S SUMMIT, MO. Curtis & Cowling, 4325 Main, Kansas City, Mo., archts.

▲ **Thomas Constr. Co.**, 1111 So. 8, St. Joseph, Mo., LB **$1,735,000**, 4 story, bsmnt. T-shaped, 123x205 ft. WOMEN'S DORMITORY ADDN. and 3 story 188x259 ft. L-shaped MEN'S DORMITORY, CH Mo. 64 (D), MARYVILLE, MO. Northwest Missouri State College, Maryville, Mo. Wm. L. Cassell, Carbon & Carbide Bldg., Kansas City, Mo., mechanical engrs. Pfuhl & Stevson, 15 W. 10 St., Kansas City, Mo., structural engrs. BA 3/7. CD 2/8/61.

▲ **Manhattan Corp.**, 4802 Dodge St., Omaha, Neb., Owner Builds, **$2,000,000**, 200 units, MOTOR HOTEL, Eppley Airfield, swimming pool, parking OMAHA, NEB. Western Village System, Phoenix, Ariz., lessee. Cliff Burlew & Associates, 5212 Colfax Ave., North Hollywood, Calif., archts.

▲ **Jaksa Constr. Co.**, 1111 Hawthorne St., Houston, Tex., CA **$1,200,000**, 6 story, 96,000 sq. ft. masonry OFFICE, Montrose Blvd., HOUSTON, TEX. Southern States Life Insurance Co., 3400 Montrose Blvd., Houston, Tex. Jas H. Howard & Associates, 2728 Weslayan St., Houston, Tex., and Clark Craig, 403 E. 15th St., Austin, Tex., engrs.

▲ **Paul J. McConnell, Builder**, 2044 Colquitt St., Houston, Tex., Owner Builds, **$6,500,000**, 70 DWELLINGS, Candlewood Drive and Pine Forest Rd., HOUSTON, TEX.

CIRCLE 235 ON READER SERVICE CARD→

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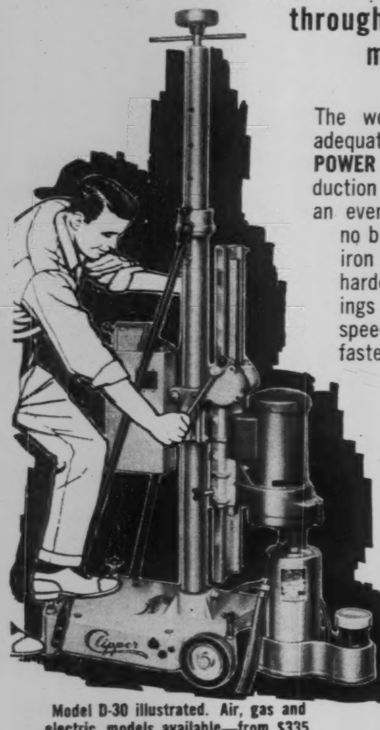

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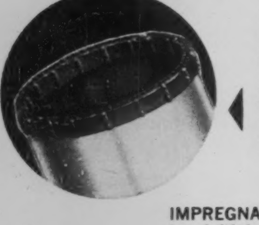
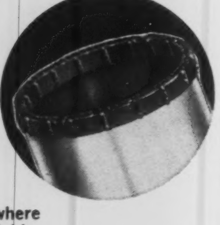
CONSTANT SPEED . . . it is essential to vary the speed when using different sized bits. Clipper core drill gives you a choice of 300, 800, 1500 R.P.M. — a must when drilling through reinforced concrete. Don't be misled—adequate power and speed are necessary, for they give you longer bit life and faster drilling. Compare Clipper's drill with the limited duty hand drill motor that has insufficient power, has lightweight housing and gears, and slows down under load.

Model D-30 illustrated. Air, gas and electric models available—from $335.



ORIENTED SURFACE SET RESETTABLE BITS give maximum bit life in hardest steel reinforced concrete.

SURFACE SET "THROW-A-WAY" BITS—Combine drilling speed of resettable bit with convenience of "throw-a-way" bits.



IMPREGNATED "THROW-A-WAY" BITS where low initial cost is essential, are also available.

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FACTORIES: AUSTRALIA, ENGLAND, FRANCE, GERMANY, ITALY

709x

▲ **The Rackle Co. of Texas**, 8400 Lyons St., Houston, Tex., CA **$1,375,000**, manufacture, fabrication, erection of outer walls, Jefferson OFFICE bldg., HOUSTON, TEX. Cullen Center, Inc. (500 Jefferson Bld.) Gereld A. Veltmenn, 1st. City Natl. Bank Bldg., Houston, Tex. Walton Becket & Associates, 802 Lovett Blvd., Houston, Tex., archts.-engrs. CD 12/10/59.

▲ **T. & M. Corp.**, c/o F. Theilen and Jas. E. McDaniel, III, 7806, Oldhaven St., Houston, Tex., Owner Builds, **$3,750,000**, 119 DWELLINGS, vicinity Goose Creek Country Club, HOUSTON, TEX. Knostman & Webster, 2017 W. Gray St., Houston, Tex., archts.

▲ **Ferrell Constr., Co.**, Vernon, Tex., Owner Builds, **$1,650,000**, 150 DWELLINGS, VERNON, TEX.

▲ **Sven Soderquist**, 2065 South Adams, Denver, Colo., CA Approx. **$1,750,000**, Third phase, 140,000 sq. ft., Alameda SHOPPING CENTER, LAKEWOOD, COLO. Alameda Shopping Center, (Kings of Boston), S. Zuni St. and W. Alameda Ave., Lakewood, Colo. Simon & Hipp, 1922 E. 18th Ave., Denver, Colo., archts. CA 3/8/61. CD 9/28/60, under Kings of Boston, as owner.

▲ **Woodlock Constr. Co.**, Pueblo, Colo., CA Approx. **$1,559,000**, est. $1,000,000, two story, 99 unit, MOTOR HOTEL, RESTAURANT, SWIMMING POOL, PUEBLO, COLO. Jess Kortz, Equitable Bldg., Denver, Colo. CD 1/19/61.

▲ **Stearns Rogers Mfg. Co.**, 660 Bannock, Denver, Colo., CA Approx. **$3,500,000**, design and constr. POTASH PLANT ADDN., CARLSBAD, N. M. Potash Co. of America, Carlsbad, N. M.

▲† **E. I. Noxon Constr. Co.**, 1513 W. Temple St., Los Angeles, Calif., CA Approx. **$1,250,000**, 100 HOMES, LOS ALAMOS, N. M. Atomic Energy Comn., Los Alamos area Office, Los Alamos, N. M.

FAR WEST

HEAVY CONSTRUCTION—BA

▲† **Nev., Las Vegas**—BA About 5/4—U. S. Eng., 180 New Montgomery St., San Francisco, Calif., DORMITORIES, airmen, DINING HALL, airmen and SERVICE CLUB, Nellis Air Force Base, Clark Co., ENG-04-203-61-287, $1,500,000. (Small busines set-aside). CD 8/1/60.

BUILDINGS—BA

▲ **Utah, Logan**—BA 3/30—Latter Day Saints Church, Bldg. Committee, 125 S. Main, Salt Lake City, STUDENT LIVING QUARTERS. $2,000,000. Plans deposit $100. Sterling R. Lyon, Kiesel Bldg., Ogden, archt. CD 9/23/60.

▲ **Hawaii, Waikiki**—BA 4/3—St. Augustine Church & Rectory, 2512 Kalakau Ave., Honolulu, concrete, steel CHURCH and RECTORY. $1,250,000. George W. McLaughlin, Hideo Kobayashi, Robert Liebsack, 1939 S. King St., Honolulu, Hawaii, archts. Donald T. Lo, 1577 Thurston Ave., Honolulu, Hawaii, engr.

▲ **Calif., San Jose**—BA 4/18—State Div. Architecture, 1120 N St., Sacramento, 99,000 sq. ft. rein.-con. EDUCATION BLDG., San Jose State College, W. O. 4304GC-33. $1,850,000. CD 8/7/59.

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 3/9, ROAD,
Frederickson & Watson, Jack L. Adams and Wade G. Ellis Constr. Co., 45-561 Oasis St., Indio, Calif., LB **$3,126,262**, (4 bidders), grading, paving 1.1 mi. eight lane freeway, San Diego Freeway between Artesia Blvd. in Torrance and 0.3 mi. west of Hawthorne Blvd. in Lawndale, Los Angeles Co. CD 1/25/61.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 3/9, ROAD,
Ukropina, Polich, Kral, Ukropina, 201 East Las Tunas Dr., San Gabriel, Calif., LB **$2,497,582**, (5 bidders), grading, paving 0.8 mi. eight lane freeway Hollywood Freeway Extension from Ventura Freeway to Magnolia Blvd., Los Angeles Co. CD 2/1/61.

▲† **A. Teichert & Son**, 15534 East Cypress Ave., Baldwin Park, Calif., CA **$3,637,964**, Walnut Creek CHANNEL IMPRVS. Charter Oak Wash to Walnut Creek Inlet Channel, West Covina, CIVENG-04-353-61-16, CALIFORNIA. U. S. Eng., 751 South Figueroa St., Los Angeles, Calif. BA 3/10. CD 3/15/61, under LB.

▲† **Quiller Constr. Co., Inc.**, 8374 West 3 St., Los Angeles 48, Calif., CA **$1,365,339** MODIFICATION WHERRY HOUSING, CASTLE AIR FORCE BASE, CALIF. Base Procurement Office, Castle Air Force Base, Calif.

▲ **Guy F. Atkinson Co.**, Box 259, Long Beach, Calif., CA **$1,483,420**, WHARF and BERTHS 90, 91, 92 San Pedro, LOS ANGELES, CALIF. Los Angeles Harbor Dpt., City Hall, Los Angeles, Calif. CD 3/1/61, under LB.

▲ **Steve P. Rados, Inc.**, 112 West Maple Ave., Monrovia, Calif., LB **$5,294,195**, (8 bidders) Proj. 57, Arroyo De La Sacatela STORM DRAIN, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. BA 3/10 CD 2/6/61.

▲ **U. S. Steel Corp.**, 120 Montgomery St., San Francisco, Calif., LB **$6,180,573**, (7 bidders), Unit III, 10 mi. pile-supported elevated 87 in. ID 3rd Mokelumne AQUEDUCT, San Joaquin and Contra Costa Counties OAKLAND, CALIF. East Bay Municipal Utility Dist., 2130 Adeline St., Oakland, Calif. CD 6/9/58.

BUILDINGS—LB & CA

▲ **Stolte, Inc.**, 501 N. Virginia St., Reno, Nev., LB **$2,490,000**, (5 bidders), ENGINEERING anc

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NUCLEAR BLDG., rein-con. constr., Class C, Type II constr. RENO, NEV. University of Nevada, 201 Fall St., Carson City, Nev. DeLongchamps & O'Brien, Alegre & Harrison, 160 N. Arlington Way, Reno, Nev., archts. BA 3/9/61. CD 2/10/61.

▲ **Erickson Constr. Co.,** 977 Arden Way, Sacramento, Calif., LB **$1,259,513,** (4 bidders), rein.-con., steel PHYSICAL SCIENCES, Unit No. 1, 4 bldgs., DAVIS, CALIF. Regents of University of California, c/o Office of Architects and Engineers, A & E Bldg., University of California, Davis, Calif. Barovetto & Thomas, Inc., 618 Alhambra Blvd., Sacramento, Calif., archts. CD 8/13/59.

▲ **Rothschild, Raffin & Weirick,** 875 Sansome St., San Francisco, Calif., LB **$1,835,900,** (4 bidders), 600 student capacity ENGINEERING BLDG., California State Polytechnic College, SAN LUIS OBISPO, CALIF. State Div. Architecture, 1120 N St., Sacramento, Calif. BA 3/14. CD 2/16/61.

▲ **Haas & Haynie,** 2259 Kalalaua Ave., Honolulu, Hawaii CA **$1,200,000,** 2 story PARKING GARAGE, WAIKIKI, HAWAII. Waikiki Multi-Deck Corp., International Market Pl., Waikiki, Hawaii. Alfred Yee & Assocs., 914 Ala Moana Blvd., Honolulu, Hawaii, archts. CA 2/1/61.

CANADA

HEAVY CONSTRUCTION—LB & CA

▲ **Drake Constr. Co., Ltd.,** 155M 1485 Portage Ave., Winnipeg, Man., LB **$1,274,500** (8 bidders), WHARF EXTENSION, CHURCHILL, MAN. National Harbors Bd., Hunter Bldg., Ottawa, Ont.

▲ **ONTARIO**—Dpt. Hys., Parliament Bldgs., Downsview, BRIDGE,

Runnymede Steel Constr. Ltd., 3370 Dundas St. W., Toronto, Ont., CA **$3,379,500,** center superstructure Homer 6-lane high level bridge over Welland Canal, (Contract 60-294), Homer. BA 2/22/61. CA 3/10/61. CD 3/1/61, under LB.

BUILDINGS—LB & CA

▲ **Dave King Constr. Ltd.,** 12 Oxford St. W., London, Ont., CA Est. **$2,500,000,** 288 x 690 ft., brick, glass SHOPPING CENTER, air conditioned mall, Hy. 401 and Wellington Rd., LONDON, ONT. Mortex Corp. Ltd., c/o Steve Polon, 837 Eglington, Ave., W., Toronto, Ont. Embacher, Kulynych & Richards, 4901 Yonge St., Toronto Ont., archts.

▲ **McNamara (Quebec) Ltd.,** 3901 Jean Talon St. W., Montreal Que., CA Est. **$3,000,000** (13 bidders), 20 mi. RAILROAD to join Iron Ore Company's Schefferville-Sept.Iles line POINTE NOIRE, QUE. Arnaud Railroad Co., sub. Wabush Iron Co., Ltd., 1010 St. Catherine St. W, Montreal, Que. BA 3/6/61. CD 2/14/61.

PUERTO RICO

HEAVY CONSTRUCTION—BA

▲ **Puerto Rico, San Juan**—BA 4/6—City of San Juan, Dpt. P. Wks., rein.-con. Municipal BASEBALL STADIUM. $3,000,000. Extended date. Pedro A. Mirando, 573 Munoz Rivera Ave., San Juan, Puerto Rico, archt. Pedro A. Miranda & Assocs., 573 Munoz Rivera Ave., San Juan, Puerto Rico, engrs. CD 3/1/61.

BUILDINGS—BA

▲ **Puerto Rico, San Juan**—Bids Asked—First National City Bank of New York, 2 San Justo, 10 story, 55,000 sq. ft. HEADQUARTERS, $2,000,000; constr. 4 floor, 22,000 sq. ft. BANK, remodeling Ponce Branch, $1,000,000. Rene O. Ramirez, 1504 Ave. Ashford, San Juan, Puerto Rico, archt. Bids April.

BUILDINGS—LB & CA

▲ **Rodriguez y Del Valle, Inc.,** P. O. Box 2889, San Juan, Puerto Rico, LB **$1,218,000,** Proj. PR 3-101, 150 unit rein.-con. PUBLIC HOUSING, 18 bldgs., ARECIBO, PUERTO RICO. Puerto Ricto Urban Renewal & Housing Corp., P. O. Box 397, Rio Piedras, Puerto Rico. Pont & Montilla, P. O. Box 9611, San Juan, Puerto Rico, archts.

▲ **Interstate General Contractors, Inc.,** Calle Labra 800, San Juan, Puerto Rico, CA Est. **$6,000,000,** Parkville RESIDENTIAL DEVELOPMENT, 650 rein.-con. nomes, SAN JUAN, PUERTO RICO. Quality Homes, Inc., Garcia Commercial Bldg., 221 calle Labra 800, San Juan, Puerto Rico. V. Muniz Nunez, Garcia Commercial Bldg., Office 220 calle Labra 800, San Juan, Puerto Rico, archt.

AMERICANS ABROAD

BUILDINGS—BA

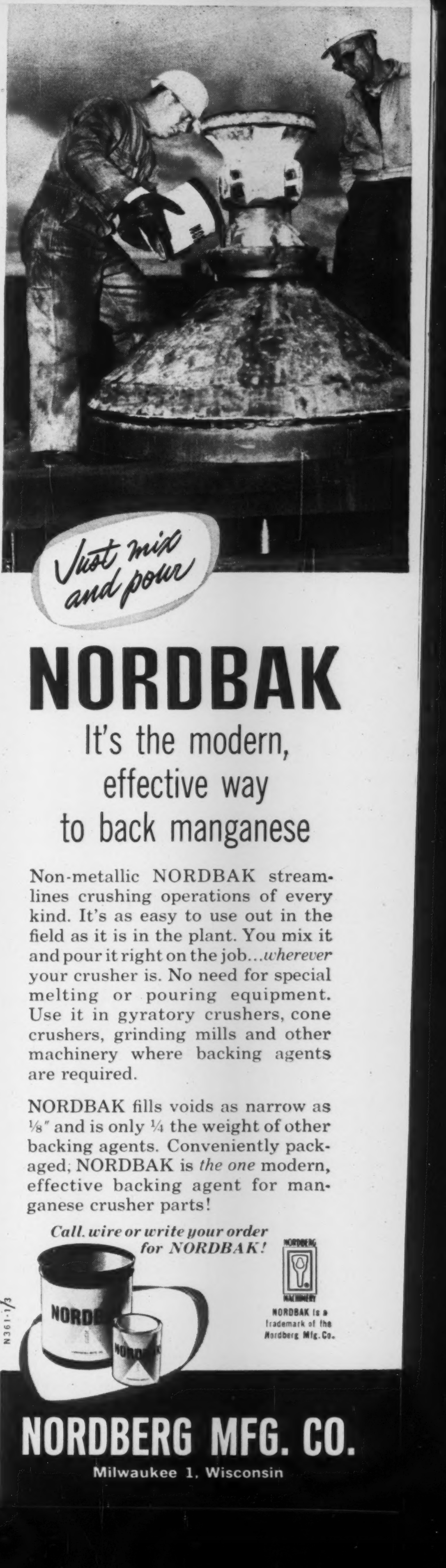
▲ **India**—BA 6/16—West Bengal State Electricity Board, New Secretariat Bldg., 1 Hastings St., Calcutta, Zone 1, Phase 1, 600,000 lbs. per hour STEAM GENERATING UNITS using pulverized coal; 75,000 KW, 13,800 volts, 3 phase, 50 cycle 5 extraction point; 3.5 Hg absolute back pressure turbo-generator; auxiliary equipment and electrical equipment, Bandel Thermal Power Station, Job K-2171. Kuljian Corp., 1200 N. Broad St., Phila. 21, Pa., U.S.A., consult. engrs.

BUILDINGS—SLC

▲ **British West Indies**—BA 3/31—Caribeach, Ltd., Myrtle Bank Hotel, Kingston, Jamaica, four 2-story, 52 rooms each concrete block slab and rein.-con. HOTELS, St. Lucia, Grenada, Antigua and Tabago. $1,000,000. Charles Giller & Assocs., 4100 N. Miami Ave Miami, Fla., U.S.A., archts.-engrs.

CIRCLE 237 ON READER SERVICE CARD→

N361-1/3



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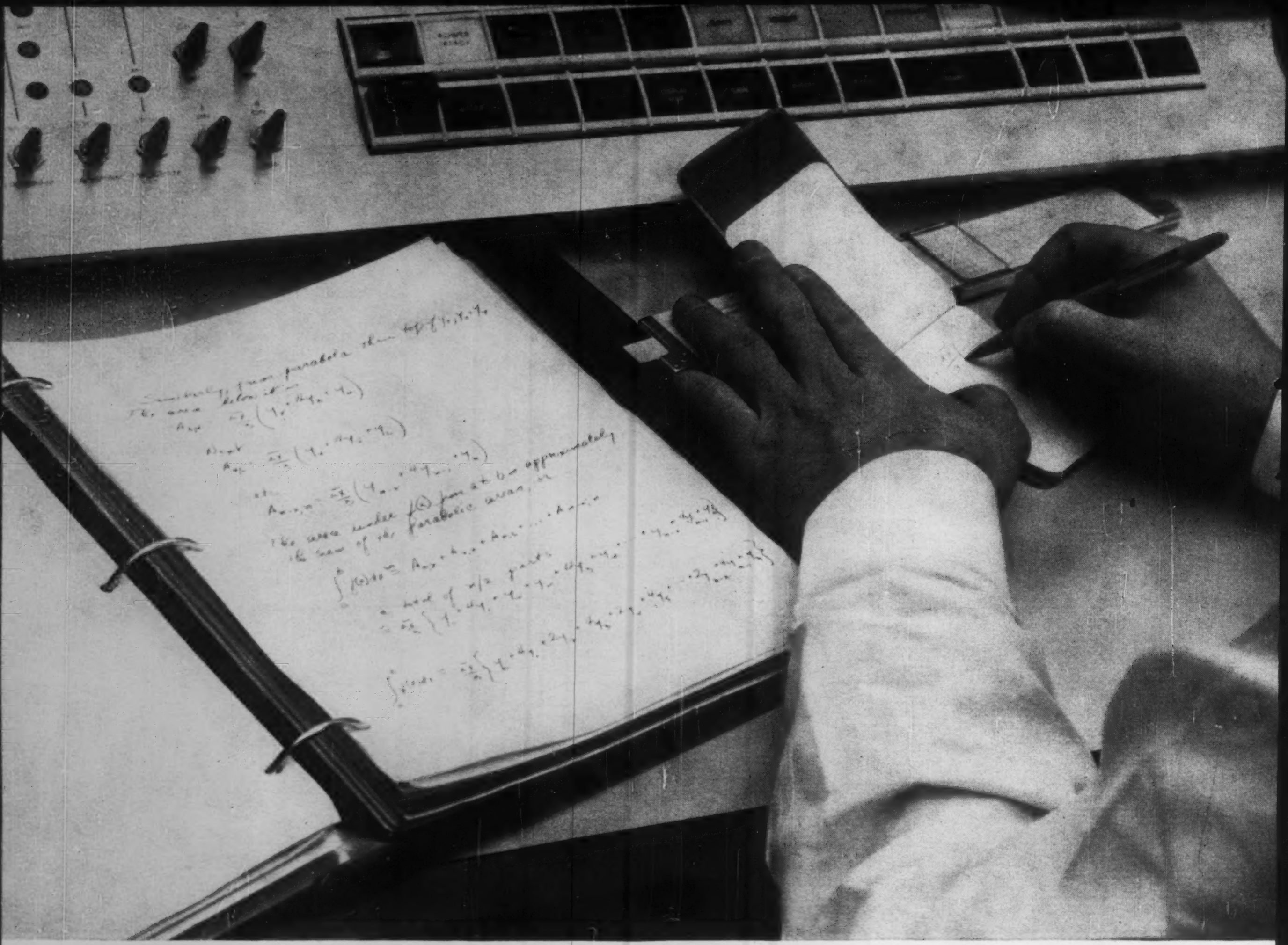

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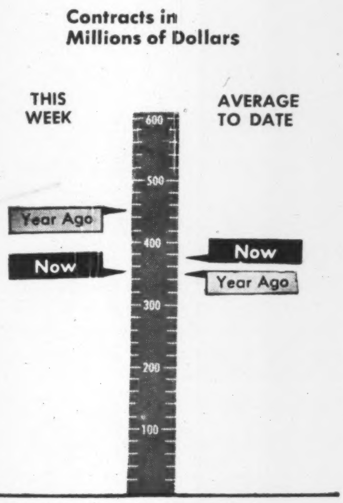
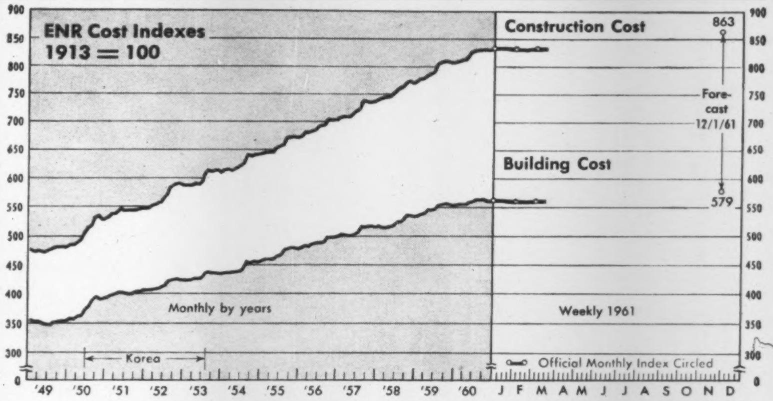
Construction Scoreboard

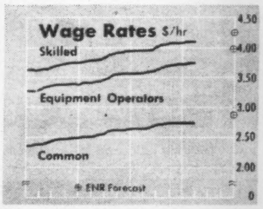
This Week . . .

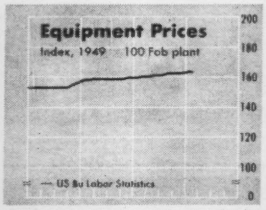


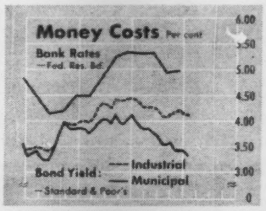


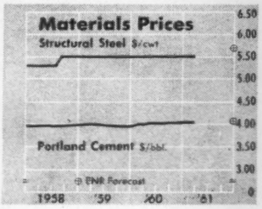
ENR INDEXES (1913=100), 20-cities' average	Week of Mar. 16 1961	% Change from Feb. 16 1961	% Change from Mar. 17 1960
Construction Cost	834.25	+0.02	+2.6
Building Cost	562.98	+0.05	+1.5

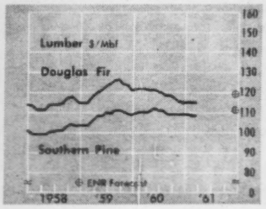
To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850. 1919 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

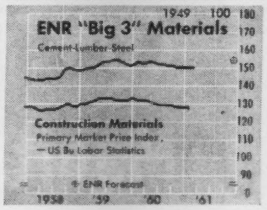












AMOUNT OF CONTRACTS LET

Contracts Awarded In 50 States By Type	This Week (millions)	Cum. 12 wks 1961 (millions)	Chge '60-'61 %
All Heavy Construction	$353.9	$4,527.4	+6
By Ownership			
PRIVATE	169.3	2,280.9	−1
PUBLIC	184.6	2,246.5	+13
State & Municipal	154.6	1,685.6	+15
Federal	30.0	560.9	+8
By Type of Work			
PUBLIC			
Waterworks	8.8	83.5	+22
Sewerage	27.3	152.9	+23
Bridges*	15.4	114.2	−44
Highways	60.4	768.9	+36
Earthwork, Dams & Waterways	9.6	143.7	−2
Buildings:			
Excl. Housing	41.3	553.8	+20
Housing	8.5	144.4	+37
Unclassified	13.3	285.3	−9
PRIVATE			
Buildings:			
Mass Housing	70.6	946.6	−13
Commercial	35.9	490.7	+7
Industrial	57.5	739.3	+40
Unclassified	5.3	104.1	−53

* Includes Private bridges

NOTE Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88.000; industrial buildings, $110,000; other buildings, $400,000.

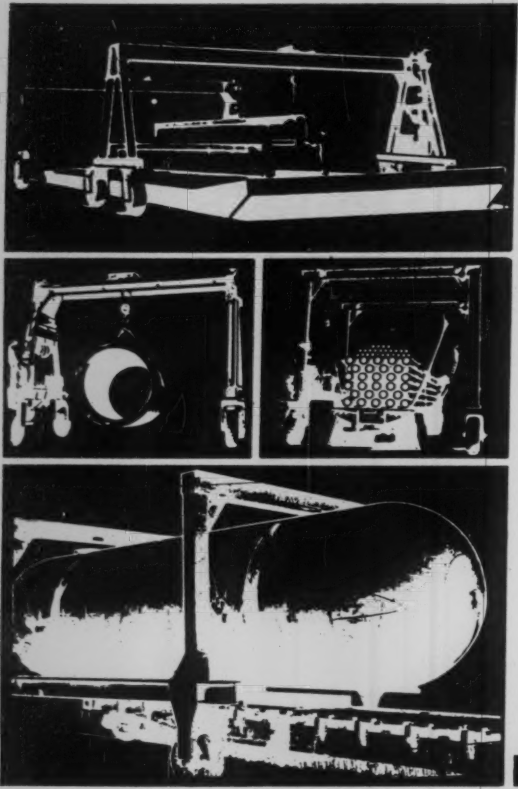
NEW CONSTRUCTION CAPITAL

	Week of Mar. 16 (millions)	Cum. 11 wks 1961 (millions)	Chge '60-'61 %
Corporate Securities	$15.2	$331.4	−37
State and Municipal:			
All Except Housing	131.2	1,388.3	−11
Housing	13.5	17.5	+29
Federal Loans	6.3	49.3	+15
Federal Aid	0	0	0
Total Nonfederal	$166.2	$1,786.4	−17
Federal Appropriations:			
Project in U.S.	0	0	0
Outside U.S.	0	0	0
Total New Capital	$166.2	$1,786.4	−17

ENR COST INDEXES IN 22 CITIES, 1913=100

City	Construction Cost March 1961	Construction Cost Percent Change from last Month	Construction Cost Percent Change from last Year	Building Cost March 1961	Building Cost Percent Change from last Month	Building Cost Percent Change from last Year
Atlanta	652.78	0	+2.2	504.08	0	+1.8
Baltimore	754.18	0	+2.0	560.02	0	+1.4
Birmingham	674.37	0	+3.3	527.38	0	+2.1
Boston	853.06	+0.1	+2.4	576.63	+0.2	+2.1
Chicago	905.11	−0.06	+1.5	580.17	−0.07	−0.2
Cincinnati	837.86	−0.07	+2.8	543.64	−0.1	+0.6
Cleveland	946.12	−1.8	+2.8	563.27	0	+1.8
Dallas	640.32	0	+6.0	527.29	0	+7.3
Denver	756.22	0	−0.2	553.43	0	+2.1
Detroit	963.54	0	+0.08	605.32	0	+1.1
Kansas City	812.88	0	+1.8	553.43	0	+1.4
Los Angeles	897.32	−0.4	+3.1	557.82	−0.6	+0.3
Minneapolis	897.84	0	+4.4	575.71	0	+1.1
New Orleans	654.27	0	+1.5	507.84	0	−1.3
New York	1,057.88	−0.1	+4.6	662.04	+0.2	+2.6
Philadelphia	830.49	0	+4.7	589.86	0	+1.7
Pittsburgh	885.14	0	+3.2	625.80	0	+2.8
St. Louis	900.86	0	+2.4	581.55	0	+0.5
San Francisco	877.73	+0.2	+3.1	554.94	−0.4	+0.8
Seattle	882.90	0	+2.7	507.31	0	+1.1
U. S.—20 Cities' avg.	834.16	−0.01	+2.5	562.89	−0.01	+1.4
Montreal	648.79	0	+2.9	464.48	0	+1.2
Toronto	687.60	0	+2.2	489.73	0	−1.1

←CIRCLE 238 ON READER SERVICE CARD



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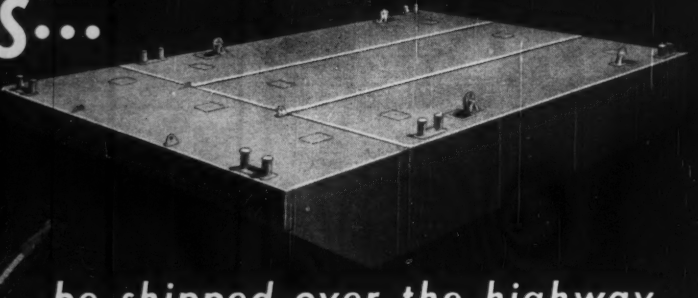
CONTRACTORS...



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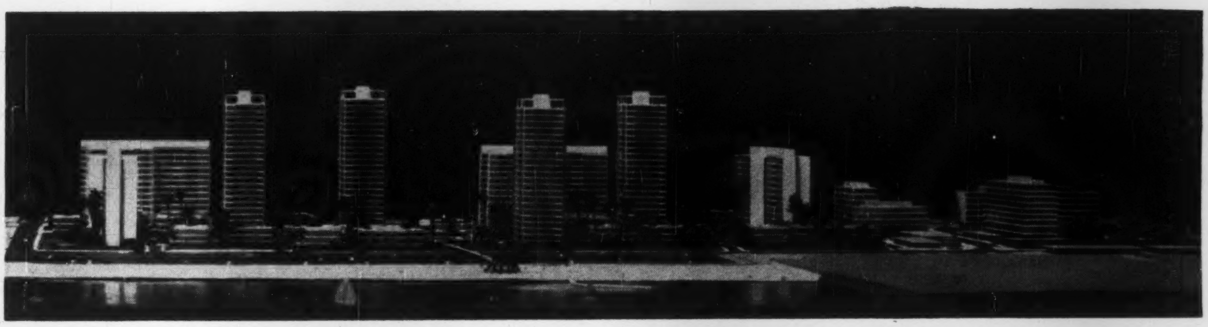
CIRCLE 240 ON READER SERVICE CARD

Business and Finance



Renewal plans in Santa Monica, Calif., include this $51-million skyline. Elsewhere . . .

Plans Crop Up, Come a Cropper

Since President Kennedy handed a housing program to Congress that among other things would perhaps get the nation's urban renewal operation into a higher gear, six sections of the country have been pressing harder on their own redevelopment accelerators. In three other areas, however, the brakes were either applied or the vehicle was rejected.

Gains were scored in Santa Monica, Calif., Norfolk, Va., Philadelphia and St. Louis. In New York and Wisconsin, state legislation is pending which, if approved, will speed progress on local urban redevelopment projects. In Boston, a project's progress will be slowed, while in Phoenix and all of Utah, the urban renewal concept was rejected.

Santa Monica received a $51-million residential and commercial proposal (picture) that apparently tops those of 10 other bidders for the city's 36-acre Ocean Park Redevelopment Project. All, however, must be reviewed by the Urban Renewal Administration, the city's redevelopment agency and the Citizens Progress Committee. A decision is expected early in June.

Apparent high bidder is a team consisting of Kern County Land Co. and Del E. Webb Corp., which offered the city $5.8 million for the land to be developed for residential use and a rent of $103,000 a year for 50 years for the commercial section.

The Kern-Webb proposal calls for construction of about 2,000 living units contained in four 21-story buildings, four 13-story buildings, and several two- and three-story garden apartment buildings. Other units would be an underground garage, a shopping center, a six-story office building, an eight-story motel, a marina and recreational facilities such as swimming pools and tennis courts.

Construction would start in the spring of 1962, with completion scheduled in 1967. Welton Becket & Associates, Los Angeles architect-engineers, are the designers.

In Philadelphia, a huge project was moved closer to a start with the approval by the Redevelopment Authority of a contract between the two developing corporations that will share in construction of the $300-million Eastwick project.

Developers are New Eastwick Corp. and Philadelphia Builders Eastwick Corp. The New Eastwick organization is comprised of Reynolds Metals Co. of Richmond, Va., and two brothers, Samuel A. and Henry A. Berger of Philadelphia. The second company is made up of eight Philadelphia builders.

The 2,500-acre site now being cleared by the authority will contain commercial and industrial structures and 10,000 residential living units.

On another front, Mayor Richardson Dilworth sent legislation to the City Council that will pave the way for a start on two other urban renewal projects involving public and private investment totaling $100 million. One is the $50-million Washington Square job, which will consist of five 30-story apartment buildings, 144 row housing units and low rise apartment buildings. The second is the 10-block East Poplar Project slated to be redeveloped as a business and residential area.

Norfolk took a first step in getting a $38-million renewal job under way when the Redevelopment and Housing Authority applied to the Housing and Home Finance Agency for $162,925 preliminary planning loan. The local agency will plan the renewal and redevelopment of a 445-acre site. Plans call for construction of 2,000 houses and commercial buildings. Cost to the city and federal government will be $3.4 million and $6.8 million respectively. Private outlays are expected to exceed $27 million.

First phase of the 10-year renewal project is expected to be completed in about 15 months.

In St. Louis, construction just started on the first section of housing in the city's Mill Creek Valley area. This project eventually will contain 2,100 living units in high-rise and garden apartment buildings.

Wisconsin and New York states would accelerate urban renewal through both enabling legislation and money.

The Wisconsin legislature approved a proposed state constitutional amendment that will be submitted to voter-action April 4. If accepted, communities will be allowed to condemn private property without obtaining a jury verdict of necessity. The measure will speed acquisition of land for urban redevelopment. The proposed amendment is backed by Milwaukee and the League of Wisconsin Municipalities.

New York's legislature is considering proposals by Gov. Nelson A. Rockefeller aimed at easing the financial burden of local projects.

Mr. Rockefeller asked the legislature to appropriate $10 million this year from the capital construction fund to provide financial assistance to communities engaged in redevelopment programs. This would be in addition to funds available from a $25-million bond issue approved by the voters three years ago. This money, however, is reserved for 37 projects in 32 cities.

(Please turn the page)

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Laykold® tennis courts provide year-around, maintenance-free playability. More than 10,000 Laykold courts are now in play throughout the world. These true-plane, resilient courts are available in black, red or green; or in the new "two-tone" combinations of colors. Laykold courts were recently selected for installation at Forest Hills, as shown above.

PLAY YARDS AND TENNIS COURTS are only two examples of *special jobs* that require not only *special materials* but also *special constru-tion methods.*

In developing Walk-Top and Laykold, (plus a broad line of other asphalt specialties) we have also pioneered and developed specifications covering proper construction and application practices. These "specs" are available without charge to architects, engineers, contractors or to anyone concerned with special surfacing jobs.

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When an urban renewal site is cleared and sold to a developer at a loss, the federal government assumes two-thirds of the loss, the community the rest. In New York, the state makes up one-half of the community's one-third loss.

Governor Rockefeller also proposed that local governments be authorized to issue a new form of municipal obligation—urban renewal notes. Such borrowing would be in anticipation of receipt of federal and state subsidies.

While others move ahead, however, Boston is faced with a delay of six months at one of its six proposed projects. Charles River Park, Inc., developer of a $60-million project overlooking Charles River, asked the Redevelopment Authority for permission to push back until September the land-acquisition deadline. Under the contract, the developers were to have bought all of the land in the second section by March. A spokesman for the development company told the authority the time was required to complete a financial feasibility study, which will be based on the first complex of buildings now under way. This information is needed if loan insurance is to be obtained from the Federal Housing Administration. The first groups of buildings will be completed by the end of this year.

In Utah and in Phoenix, urban renewal is a dead issue. Utah's legislature killed a bill that would have granted communities the right to establish redevelopment agencies. It was the twelfth defeat of the measure.

And in Phoenix, Mayor Samuel Mardian, Jr., flatly rejected President Kennedy's recent plea that cities initiate redevelopment programs or accelerate those already started.

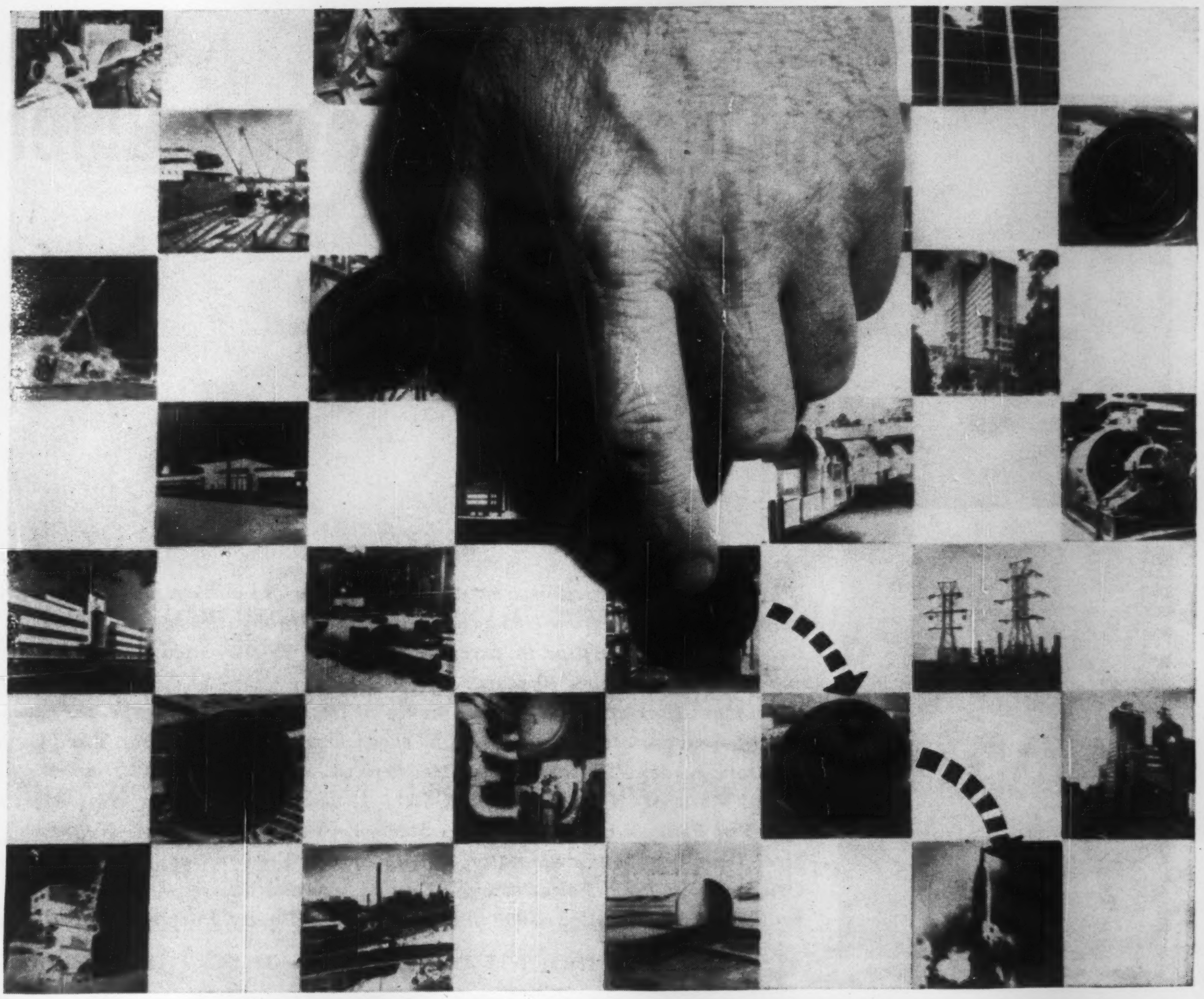
Mayor Mardian, also owner of the Mardian Construction Co., says: "There will be no federally financed urban renewal program in Phoenix. So far as I am concerned, unemployment is one problem and urban renewal is another. We cannot create any additional jobs immediately with an urban renewal program."

Private Housing Starts Went Up in February

Private housing starts, including farm housing, rose in February to a seasonally adjusted annual rate of 1,154,000 units, according to the U. S. Census Bureau.

This compares to a rate of 1,076,000 units in January and 1960's low of 979,000 in December.

Actual February starts are estimated at 73,900, off 16% from a year ago.



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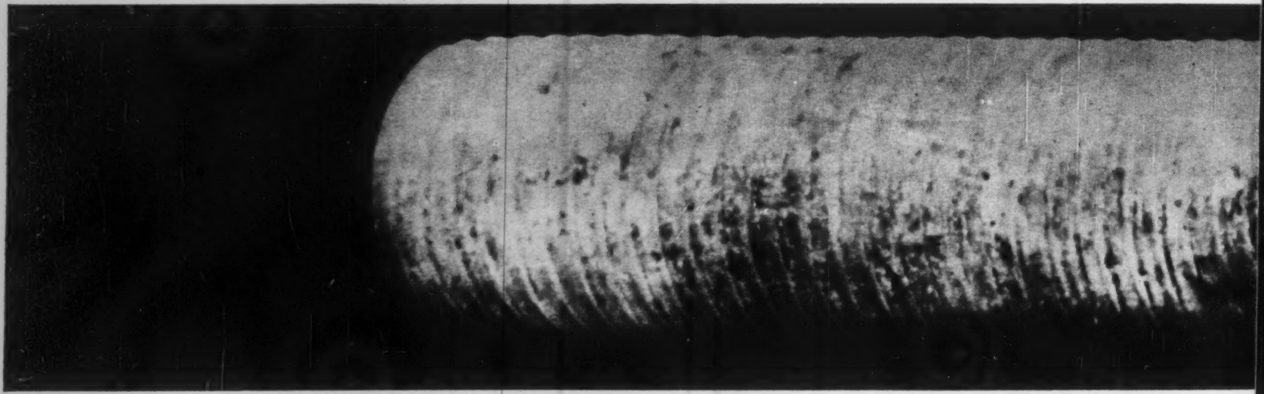
CIRCLE 243 ON READER SERVICE CARD

They put up a monument

When a road construction crew dug up a 40-year-old corrugated galvanized steel drainage pipe made from USS culvert sheets they thought they'd have to replace it. But they found the pipe in excellent condition so they used it again—and they expect it'll last another 40 years.

To mark the outstanding performance of this steel drainage pipe, they placed a 1,000-pound granite monument at the spot where the pipe now lies. The plaque on the stone reads: USS Corrugated Steel Pipe . . . 42 Years Old, 24" Diameter by 16' Long. Material—*Keystone Copper Steel 14-gauge produced by American Sheet and Tin Plate, now United States Steel—Year 1919.* Fabricator—*Nebraska Iowa Steel Tank Company, now Eaton Metal Products Corporation, Omaha.* Installed—*Originally in 1919. Pottawattamie County, Iowa.* Removed—*1959. Highway Improvements.* Reinstalled—*1960 in Pottawattamie County.* Purpose of Reinstallation—*Durability Study.*



to this galvanized steel culvert

For more information about steel drainage pipe, send for U. S. Steel's free booklet, "Culvert Sheets for Metal Drainage Products." It tells all about design, sizes and weights, installation and other important engineering details. Write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania. USS is a registered trademark.

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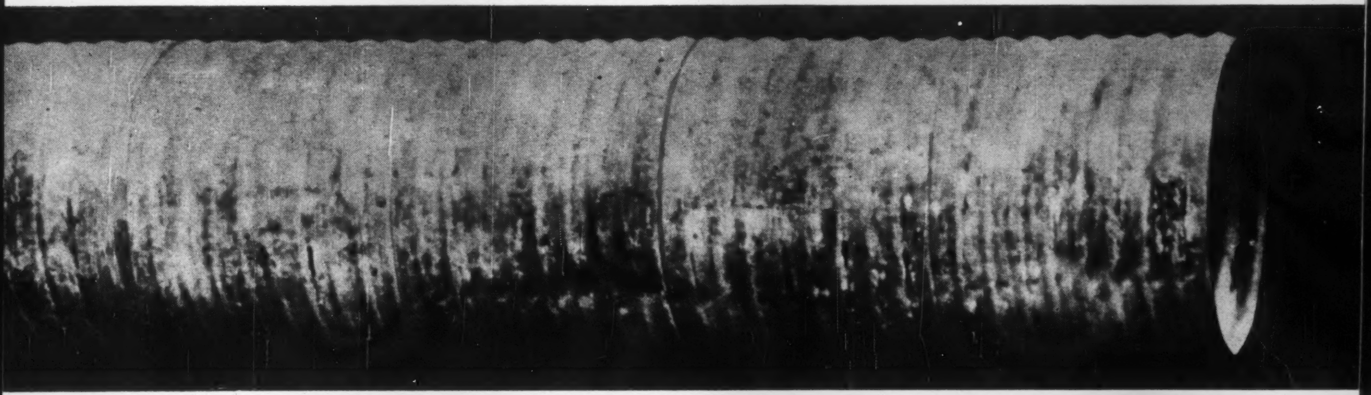

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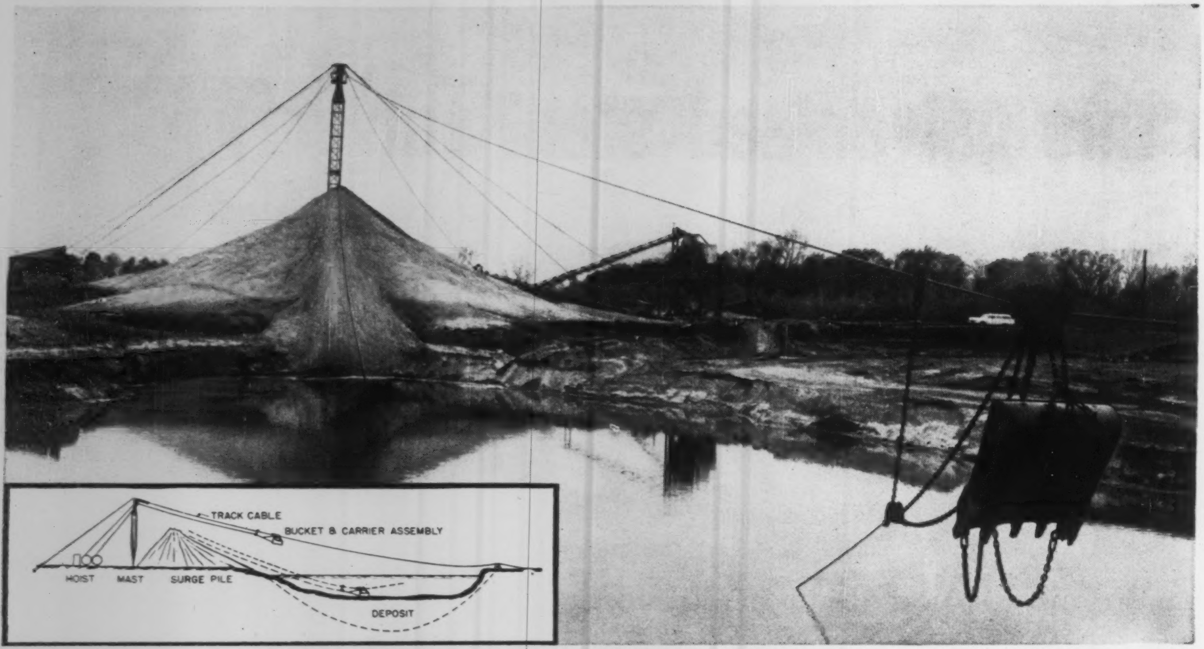

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If you are planning a new plant or modernizing an old one, consider the economies of digging and hauling your raw material with a Slackline Cableway. Direct operating costs run about 6 cents per ton for operator's wages, power and maintenance when working average deposits and hauling to a surge pile.

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A Slackline can begin operation at ground level and dig to depths which cannot be reached with other equipment. It digs 125 ft. below water and hauls up to 1000 ft. This deep digging assures maximum clean-up of your deposit. The additional material obtainable with a Slackline can keep your plant running longer without expensive relocations of equipment.

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Slackline Bucket dumps automatically over surge pile. Material is dug from a deep deposit on an 800 ft. operating span.

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Labor Scorns 'Profit Squeeze'

- **Reuther, looking at Ford situation, says one of the troubles is that executives are getting too much.**
- **Labor's economic philosophy may give a new pitch to bargaining: "Start dewatering at the top."**

A million unsold cars on dealers' lots and a fiery blast against Henry Ford II from Walter Reuther, president of the Auto Workers Union, helped explain last week why the current recession has such little dampening effect on the wage demands of organized labor generally.

Mr. Reuther, who also heads the AFL-CIO's Economic Policy Committee, took the position that it makes little sense to talk about the necessity of holding the line on hourly wages when padded employment costs of members of the management team continue to squeeze profits. In view of this, he suggested, the "can't afford" approach to collective bargaining is "sheer hypocrisy," at least in the Ford situation, and makes no economic sense at a time "when we need expanded purchasing power to get back to work the unemployed and to activate the 25% of our industrial capacity that is now idle."

The Reuther observations may foreshadow a new public relations approach by unions to collective bargaining—an approach that is a logical reverse of the "live and let live" one so often heard in the construction industry. Such an approach tends to pit labor against "managers" rather than against "management" or "stockholders" in collective bargaining and may eventually require groups like the long-range Kaiser Steel committee to revise the basic premise used in their search for a more equitable distribution of the fruits of industrial progress.

The contract language that sets up the Kaiser committee, for example, talks about "sharing" among "the stockholders, the employees and the public," leaving the relative economic interests of those on the management team unmentioned.

And the Reuther comments may also mark an inauspicious beginning for President Kennedy's top-level, Labor-Management Advisory Committee. Mr. Reuther and Mr. Ford are both members of the committee. One of the things the committee is supposed to do is to come up with recommendations that labor and management can follow to promote "sound wage and price policies."

What got Mr. Reuther's dander up was this comment by Mr. Ford in his company's 1960 annual report: "Management believes it essential to hold the line on all costs, avoiding particularly any labor cost increases that could force us to raise prices. Failure to contain costs and prices could seriously harm the interest of employees as well as stockholders and the general public." At the same time, bonuses of $33.6 million were announced. Mr. Reuther said the bonuses went to company executives.

A "typical double economic and moral standard" is the way Mr. Reuther sized it up. He called it "on a par with" the management actions that led to the recent antitrust cases in the electrical industry.

Citing Ford figures, Mr. Reuther claimed that the bonus exceeded by about $2.6 million the total wage and fringe gains made by all Ford production workers in 1960.

The "bonus melon," Mr. Reuther said, was on top of lucrative stock options to "154 specially favored executives." At the same time, he added, dividends paid per share increased 7.1%, while wage and fringe benefits for workers went up only 4.4%.

Company profits "per hour," he claimed, are "almost as much as its hourly wage bill" and do allow room for price reductions.

Returning to Mr. Ford's "hold the line" statement, Mr. Reuther said it is part of the company's "continuing policy of trying to blame labor for price increases which are actually imposed in order to swell corporation profits and management bonuses. At a time when the nation's economy needs expanded purchasing power, he added, "Ford is following the practice of giving more to its few executives who already have more than they need while denying equity to the many Ford workers and consumers who have too little."

Observers have read into the Reuther statement a UAW intention to seek another wage increase when its contracts come up for renegotiation this summer, despite the fact that glutted car lots have already idled about 85,000 auto workers. Such a demand would be in line with the AFL-CIO thesis that periods of recession call for broad-based and higher rather than lower wage levels.

This approach, dramatized and fortified by the strike weapon, gives workers, on the one hand, rather formidable protection against the profit squeeze.

The public, on the other hand, is now being protected by the law of supply and demand against drastic or widespread price increases to recoup increased production costs—a situation that received some publicity last week with respect to the steel and rubber industries.

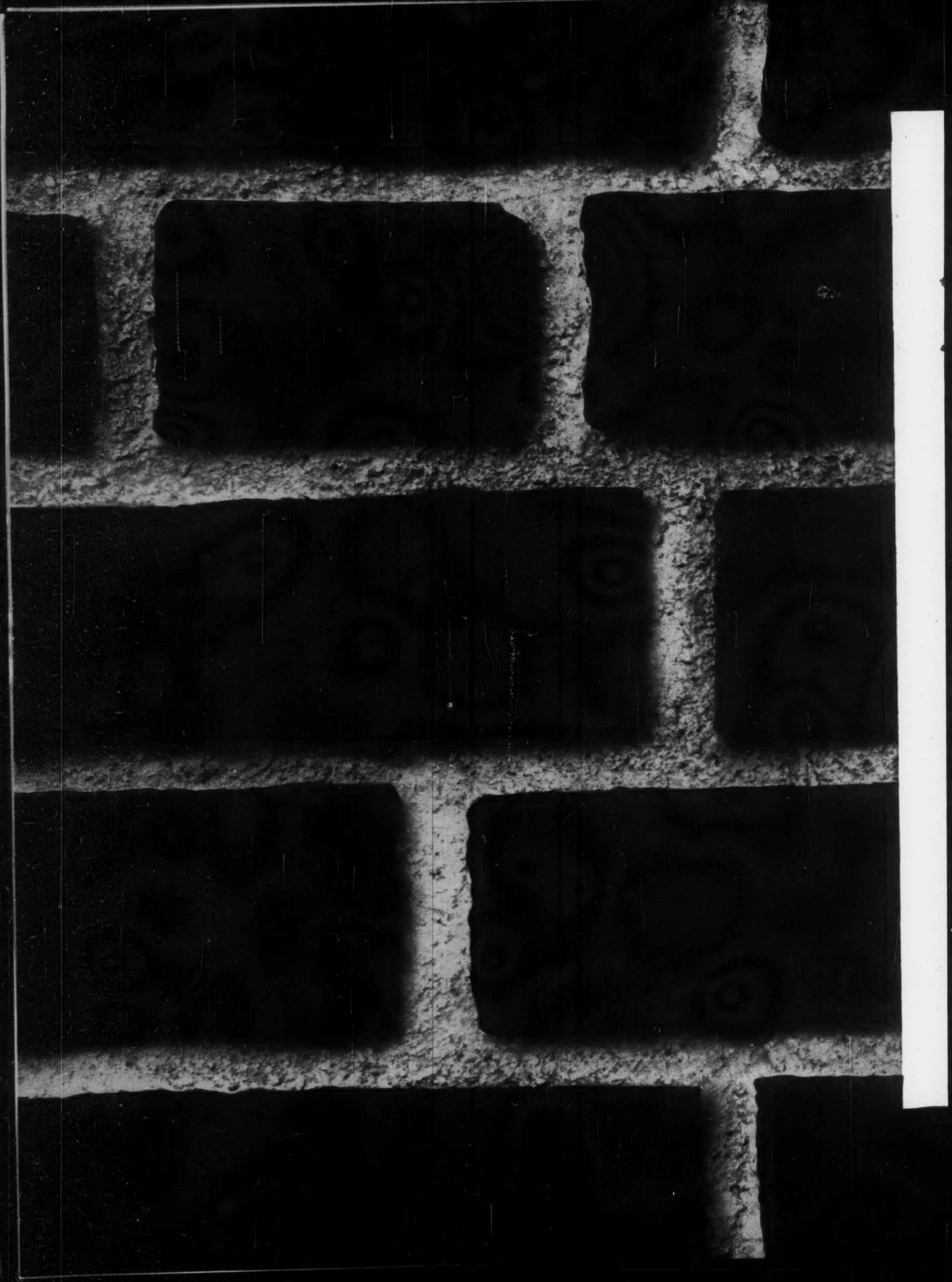
As a result, the seeds sown by Mr. Reuther in the Ford episode may fall on fertile ground and produce a harvest that makes employees in the ranks of management, rather than stockholders or hourly workers, the principal 1961 victims of the squeeze on profits—at least in the auto industry.

Democrats Gain Majority On Labor Relations Board

The five-member National Labor Relations Board shifted to a Democratic majority last week with the selection of Gerald A. Brown to fill the remaining vacancy on the federal agency. Mr. Brown, an NLRB career employee for 19 years, has been regional director at San Francisco since 1947.

The 46-year-old Democrat was picked by President Kennedy to succeed Joseph A. Jenkins who resigned to become the board's regional director at Albuquerque, N. M. He joins Board Chairman Frank McCullough, Mr. Kennedy's first appointee, and John H. Fanning, an Eisenhower holdover, to give the board its first Democratic majority since 1953.

The Republican minority now consists of Boyd Leedom and Philip Ray Rodgers, also Eisenhower appointees. The President did not indicate whether the nominee would serve until Mr. Jenkins' term expires this August, or whether he would be named for a full five-year term in addition. Board members are paid $20,000 a year.



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1. LONG LASTING . . . DEEP PENETRATION . . . POSITIVE PROTECTION . . . Tests prove that a single application provides complete treatment and immediate water repellency on most masonry surfaces for a much longer period of time than any previous water repellent.

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3. PROTECTS AGAINST DIRT AND EFFLORESCENCE . . . HYDROCIDE S-X HYCON helps preserve the original appearance of exterior walls by excluding atmospheric moisture and minimizing the adhesion of air-borne dirt which stain or darken most surfaces; and helps reduce the possibility of surface salt deposits, spalling and cracking of masonry caused by freezing and thawing.

4. PERMITS "BREATHING" . . . HYDROCIDE S-X HYCON permits masonry to "breathe" since it does not plug or smother the masonry pores. It simply imparts long-term water repellency to the *inner surface of these pores.* Result: Moisture in the liquid phase cannot enter, yet moisture in the wall can easily escape or "breathe" out as water vapor.

5. INSURES DURABILITY OF INTERIOR FINISHES HYDROCIDE S-X HYCON applied to the exterior wall surface minimizes risks of moisture moving through the wall to the interior face. Damages to the interior wall surface such as dampness, peeling of wall paper, blistering of paint and unsightly efflorescence are thereby reduced.

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CIRCLE 68 ON READER SERVICE CARD

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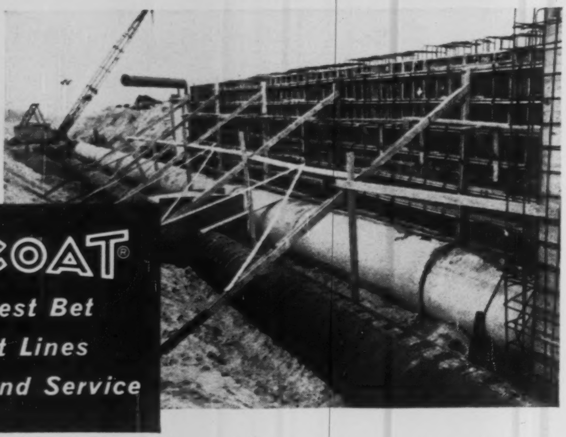

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Engineers Need Not Join City Employees' Union

Engineering and other professional workers will not be affected by a maintenance of membership clause in a labor contract that the City of Philadelphia is expected to approve this week.

The provision is a watered down version of a controversial union shop clause proposed two years ago. In its original form, the clause would have covered all nonuniformed municipal workers. Engineers and some of the professional societies joined in the effort that led to its defeat.

Under the new agreement, which has been approved by the union and a City Council subcommittee, new city employees in 188 job classifications will be required to join District Council 33, American Federation of State, County and Municipal Employees, AFL-CIO, which represents the city's workers. Most of the classifications cover blue collar workers.

Union officials hailed the agreement as a "great step forward for labor in Philadelphia." City officials are reportedly keeping their fingers crossed.

A top city engineering executive said last week that engineering and other professional workers have been assured that they will not be obliged to join the union. Only a few of these workers have joined so far.

The city's Civil Service Commission, meanwhile, has taken the position that workers who are subject to the clause and who refuse to join the union will not be fired.

If the commission sticks to its ultimatum, the clause is expected to be challenged in the courts.

Vacation Fund Becomes An Anti-Recession Tool

In an effort to give Detroit's sagging economy a shot in the arm, the local carpenters union and the Associated General Contractors have agreed to make an advanced payment of $1,750,000 in vacation benefits to 10,000 carpenters in the area.

Over half the carpenters in that section of Michigan are currently unemployed and another 2,000 are working only part time.

Other unions in the area are viewing the carpenters' action with interest. Stanley Veighey, labor relations manager of the AGC, credits Lucien M. Weir, secretary of the Carpenters Council, with the idea.

The vacation money, accumulated through a 6% payroll tax paid by employers, would normally not have been distributed until June 15.

Bids: March 29, 1961

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time, on the 29th day of March, 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 1, N. F. Ronan, Act. District Engineer, 353 Broadway, Albany 1, New York						
Essex, Clinton, (Rtes 9 & 86)	R.C. 61-18	Jay-Lake Placid. Pt. 1, SH 5540 (Br. No. 1) Plattsburg-Ausable Chasm, Pt. 2, SH 5311 (Br. No. 2)	0.15	Repair to Bridges	$1,000 Plans $5	$17,000
Sara.	P.A. 61-1	Geyser Creek Picnic Area (Saratoga Springs Reservation)	0.36	Grading, Paving, Water Supply Drainage & Misc. Work	$2,800 Plans $5	51,000
Warren (Int. Trg. Rte. 87)	FISH 61-3	Interstate Rte. 502 (Gurney Lane to Luzerne Road) Proj. I-87-3(37)	3.57 (3.28 Acc.)	9" Cem. Conc. Pavt. 2 @ 24′ Var.=3.24 Mi. Misc. Work=0.33 Mi. Acc.-1.47 Mi. Cem. Conc. Pavt.; 0.38 Mi. Asph. Conc.; 1.43 Mi. Bit. Treat. Fdn. Course; 2 Hgs. Comp. WF Beam Brs. 3 Sps, 159′ TOT; 3 Sps. 213′ TOT.	$227,000 Plans $5	3,953,000
DISTRICT No. 2, L. Ketchum, District Engineer, 109 No. Genesee Street, Utica 1, New York						
Fulton, Herkimer (Rte. 29)	R.C. 61-29	Oppenheim-Dolgeville SH 5626 (Over East Canada Creek) Bridge No. 1	....	Cleaning and Painting Bridge Thru Truss—1 Span 182′	$190 Plans $5	3,250
DISTRICT No. 3, E. E. Towlson, District Engineer, 333 E. Washington Street, Syracuse, New York						
Cort. (Rte. 13)	R.C. 61-20	Cortland-Truxton, S.H. 738	5.01	Asphalt Concrete	$12,000 Plans $5	$206,000
Onon. (Int. Trg. Rtes. 690, 81)	FITS 61-9	Interstate Rte. Conn. 570 (State Fair Boulevard) FAC 56-8P (Northwest Art. Conn.) FASH 56-6P Interstate Rte. 505 (Nedrow-Lafayette) FISH 56-12 (Lafayette-Tully) FISH 56-11 Proj. I-690-3(8); I-81-2(55)	13.68 (6.85 Acc.)	Traffic Signs and Delineators	$11,000 Plans $5	192,000
Onon. (Int. Trg. Rte. 81)	R.C. 61-35	Interstate Rte. 505 (Mattydale-Brewerton, FASH 57-6)	0.15	Roadside Development	$300 Plans $5	5,000
Oswego (Rte. 69)	R.C. 61-6	Parish-Camden, Pt. 1, SH 5526	2.27	Asphalt Concrete	$15,000 Plans $5	265,000
Seneca (Rte. 96)	FARC 61-30	Waterloo Village (Fayette St.) SH 1399, Waterloo Vill. SH 1211 Waterloo Vill. SH 1211A Proj. F-626(7)	0.47	Asph. Conc. Widen. Brs. Br. No. 1 I-Beam, 1 Sp. 73.5′ C. to C. of Bear. Br. No. 2 Prestress. Conc. 3 Sps. 86′ TOT. Br. No. 3 Prestress. Conc. 2 Sps. 100′ TOT.	$25,500 Plans $5	463,000
DISTRICT No. 4, B. F. Perry, District Engineer, Barge Canal Terminal, Rochester, 1 New York						
Liv. (Rte. 15A)	R.C. 61-26	Hemlock-Lima, S.H. 1951	5.87	Asphalt Concrete	$31,000 Plans $5	550,000
Mon. (Rte. 104)	R.C. 61-23	Little Ridge, Part 5, S.H. 760	3.85	Asphalt Concrete	$20,000 Plans $5	358,000
Mon. (Rte. 260)	R.C. 61-21	Sweden-Walker, S.H. 1391	6.18	Asphalt Conc.=5.98 Mi. Misc. Work=0.20 Mi.	$25,000 Plans $5	449,000
Mon. (Rte. 33)	R.C. 61-27	Buffalo, Pt. 5, S.H. 634	2.11	Asph. Conc.=2.00 Mi.	$8,000 Plans $5	136,000
Ont. (Rtes. 96, 251)	R.C. 61-28	Pittsford-Victor, Pt. 2, S.H. 8223; Victor-Mendon, Pt. 1, S.H. 335	2.57	Asph. Conc.=2.54 Mi. Misc. Work=0.03 Mi.	$10,000 Plans $5	177,000
Wyom. (Rte. 78)	FARC 61-2	Java Center-Waldo Cors.-Smith Corners, S.H. 1716 Java Center-Java Village, S.H. 894 Proj. F-1158(2)	5.95	Asph. Conc.=5.81 Misc. Work=0.14	$43,000 Plans $5	792,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, State Office Bldg., 65 Court Street, Buffalo 2, New York						
Erie	SCE 61-1	Scajaquada Creek Expressway (Niagara St. to Delaware Ave.)	1.91 (1.95 Acc.)	Roadside Development	$3,500 Plans $5	64,000
Erie (Rte. 20A)	FARC 61-5	Orchard Park-East Aurora, S.H. 1066 Proj. F-1054(5)	5.02 (0.12 Acc.)	9" Cem. Conc. Pavt.=5.03 Mi. Misc. Work=0.11 Mi.	$85,000 Plans $5	1,500,000
Niag. (Int. Trg. Rte. 190 & Rte. 18)	FINIE 61-1P FARC 61-33P NIE 61-2P	Interstate Rte. 506 (Niagara Expressway) Contract 3 Suspension Br.-Lewiston, S.H. 475, Access "Ramp L" (Relocation of Lewiston Rd.) Proj. I-190-1(38), U-461(13)	0.86 (2.09 Acc.)	9" Cem. Conc. Pavt.=0.41 Mi. Grading, Misc. Work=0.45 Mi.; Access=1.86 Mi. Cem. Conc; 0.07 Mi. Asph. Conc.; 0.16 Mi. Grading & Misc. Work Comp. I-Beam Struct. 4 Sps. 279′ TOT.	$85,000 Plans $5	1,542,000
Niag. (Int. Trg. Rte. 190)	FINIE 61-3	Interstate Route 506, Niagara Expressway—Cont. 4 (Gill Creek to Cemetery Rd.) Proj. I-190-1(39)	2.04 (0.98 Acc.)	Cem. Conc. Pavt.=1.96 Mi. Misc. Work=0.08 Mi. Access=0.59 Mi. Cem. Conc; 0.39 Mi. Asph. Conc. Hgs No. 9, 2 Comp. I-Beam Brs., 1 Span @ 75.1′, 1 Sp. @ 75.1′ Hgs No. 8, Rehabilitating Bridge	$132,000 Plans $5	2,400,000
DISTRICT No. 6, Wm. J. Dennis, District Engineer, State Office Bldg., 30 West Main Street, Hornell, New York						
Steuben (Rte. 432)	FARC 61-24	Addison-Rathbone, SH 1598 Proj. S-580(1)	0.76	Asph. Conc.=0.63 Mi. Misc. Work=0.13 Mi. Br. No. 1 Twin Reinf. Conc. Closed Box, 23.1′ Span	$11,000 Plans $5	199,000
DISTRICT No. 7, R. W. Sweet, District Engineer, 444 Van Duzee Street, Watertown, New York						
Clint., Essex (Int. Trg. Rte. 87)	FISH 61-8	Interstate Rte. 502, Sects. 7A1 and 7A2, (Rte. 9 to Rte. 22) Proj. I-87-4(18)	2.76 (1.79 Acc.)	Asph. Conc. Type 1A 1-Hgss Comp. Beam, 4 Sps. 227.2′ TOT., 2 Brs. Welded Steel Plate Girder, 3 Sps. 319′ TOT. 5 Hgss Prestress. Conc., 3 Sps. 139.4′ TOT., 3 Sps. 151.3′ TOT., 3 Sps. 121.8′ TOT., 3 Sps, 121.8′ TOT., 6 Sps. 351.3′ TOT.	$220,000 Plans $10	4,033,000
Jeff. (Rte. 11)	R.C. 61-19	Watertown-Philadelphia, Pt. 1C, S.H. 5681, Watertown-Phila. Pt. 2, S.H. 5617	2.20	Asphalt Conc. Type 1A	$3,400 Plans $5	62,000
DISTRICT No. 8, K. C. Rauer, District Engineer, Pleasant Valley Rd., Poughkeepsie, New York						
Rock., Orange	SLP 61-1	Seven Lakes Parkway (Sloatsburg to Kanawauke Circle)	6.34	Asphalt Concrete 2 Brs., Comp. I-Beam 1 Sp 68.15′, 1 Sp. 48.31′, Alterations to Dam Bridge	$147,000 Plans $5	2,672,000
Ulster (Rte. 28)	FASH 61-9 FARC 61-32	Kingston By-pass Pt. 1 (Route U.S. 209 to Rte. N.Y. 28) Kingston-West Hurley, S.H. 5173 Proj. F-FG-U-395(7), F-1009(5)	5.40 (1.73 Acc.)	9" Cem. Conc. Pavt. (Main Line)=4.57 Mi. Cem. Conc. Pavt. (Ramps)=1.47 Mi. Asph. Conc.=0.76 Mi., Bit. Dble Surf. Treat.=0.26 Mi. Misc. Work=0.07 Mi., 2 Hgss Comp. I Beam, 1 Sp. 78.4′, 4 Sps. 226.80′ TOT.; Welded Plate Gird. Br., 2 Sps. 275′ TOT.	$260,000 Plans $5	4,560,000
West.	SBP 61-1	Sprain Brook Parkway Tuckahoe Road to Jackson Ave.	2.60 (3.45 Acc.)	8" Cem. Conc.=2.54 Mi., Misc. Work=0.06 Mi. Access=0.65 Mi. Cem. Conc. and 2.80 Mi. Asph. Conc.; Reinf. Conc. Closed Box Culvert WF Comp. Beam, 1 Sp. 52.5′ Retaining wall	$220,000 Plans $5	4,092,000
West. (Int. Tr. Rte. 287)	FICWETC 61-1	Int. Rte. Conn. 520, Cross Westchester Expressway Project I-287-2(21)	....	Traffic Signals	$7,000 Plans $5	123,000
West. (Rte. 9)	R.C. 61-17	Broadway-Mt. Pleasant, S.H. 9206; Briarcliff Manor Village, SH 5361; Ossining-Croton River, SH 5364A; Ossining Village, S.H. 5482	3.35	Asphalt Concrete	$13,000 Plans $5	224,000
DISTRICT No. 10, A. M. Sarr, District Engineer, 325 W. Main Street, Babylon, L.I., New York						
Kings. (Int. Trg. Rte. 278)	FIGE 61-1	Interstate Rte. Conn. 512 Gowanus Expressway-Cont. 3 (2nd. Ave. to 20th St. Incl. Prospect Expressway Inter-Change) Proj. EI-278-1(60)	0.66 (0.31 Acc.)	Main Line: Reinf. Conc. Slab Roadway (Struct.)= 0.30 Mi.; Grade Drain. & Misc. Work=0.36 Mi., Surf. Sts. Grade. Drain, & Misc. Work=0.31 Mi. Incl. Elev. Structure & Prospect Exp. Inter.	$350,000 Plans $10	6,458,000
Nassau (Rte. 25)	FARC 61-31	Jericho Turnpike, SH 9020 Mineola Village-Jericho Turnpike, SH 1785 Mineola Village-Jericho Turnpike, S.H. 8493 Mineola Village- Jericho Turnpike, SH 1785A Proj. U-1000(10)	2.40	Asph. Conc.=1.97 Mi., Misc. Work=0.43 Mi. Traffic Signs & Signals	$92,000 Plans $5	1,665,000
Nassau, Suffolk	FALIETS 61-1	Long Island Expressway-Cont. 7A (So Oyster Bay Road to Nassau Suffolk County Line) Proj. U-862(31)	3.61 (4.04 Acc)	Traffic Signs	$6,500 Plans $5	118,000
Nassau, Suffolk	FALIETC 61-2	Long Island Expressway, Cont. 8A (Nassau-Suffolk Co. Line to Deer Park Ave., FALIE 60-1, FALIE 60-2) Proj. U-862(33)	6.04 (9.78 Acc.)	Traffic Singals, Signs and Delineators	$8,000 Plans $5	144,000
Nassau	NSPRC 61-2	Northern State Parkway (N.Y.C. Line to Long Island Expressway)	5.24	Asphalt Concrete=5.10 Mi. Misc. Work=0.14 Mi.	31,000 Plans $5	562,000
Nassau, Suffolk	O.P. 61-2	Ocean Parkway (Meadowbrook State Parkway-Captree State Parkway)	15.37	Shoulder Widening and Landscaping=14.83 Mi. Misc. Work=0.54 Mi.	30,000 Plans $5	502,000

(Continued on page 252)

OFFICIAL PROPOSALS

(Continued from page 251)

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage), Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

If the deposit is $10.00 or more, full refund for one copy of the plans and specifications will be made to a bidder for the particular project, if such plans and specifications are returned in good condition within 30 days after the award of the contract or after the rejection of the proposal. The successful bidder is not required to return the copy of the plans and specifications in order to be entitled to such refund. If the deposit is $10.00 or more, partial refund will be made for the return of all other copies of plans and specifications in good condition within 30 days after the award of the contract or the rejection of the proposal.

Special attention of bidders is called to "Information for Bidders" in the Public Works Specifications, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as Amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bond shall conform to the provisions of the Highway Laws, as set forth in "Information for Bidders".

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPT. OF PUBLIC WORKS

Bids: April 4, 1961

Power Authority of the State of New York Niagara Power Project

ADVERTISEMENT FOR PROPOSALS FOR THE CONSTRUCTION OF HYDE PARK GOLF HOUSE IN NIAGARA FALLS, NIAGARA COUNTY, NEW YORK
SPECIFICATION NO. 409.8
NIAGARA CONTRACT NO. N 31

NOTICE TO CONTRACTORS: The Power Authority of the State of New York will receive sealed proposals for the Construction of Hyde Park Golf House, located in Niagara Falls, Niagara County, New York, until 10:30 A.M., Eastern Standard Time, on the 4th day of April, 1961, at the Authority's Office, 18th Floor, the Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The Hyde Park Golf House is a one-story building having a floor area of approximately 8,500 square feet and an interior volume of approximately 128,500 cubic feet. The building is of steel frame construction with concrete block walls faced with brick and stone. The building floor is of beam and slab construction supported on steel bearing piles. The building roof is of wood frame construction covered with asbestos shingles on the hipped sections and built-up roofing on the flat portions. The work also includes all mechanical equipment and piping for complete plumbing, heating and ventilating systems and complete electrical systems. The work further includes all necessary painting.

All work shall be completed on or before April 15, 1962.

Plans, specifications and proposal forms for the work may be obtained from the Power Authority of the State of New York, at the Coliseum Tower, 18th Floor, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of ten dollars ($10.00) per initial set of contract documents, and five dollars ($5.00) per set for additional sets, no part of which will be refunded. Plans, specifications and Proposal Forms for the work will be on file in the Authority's New York Office and the Authority's field office, 2640 Main Street, Niagara Falls, New York, and in the offices of the Engineer, Clarke and Rapuano, 830 Third Avenue, New York 22, New York, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the gross sum price bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

Bids: April 6, 1961

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
FOR
CONSTRUCTION OF ADMINISTRATION BUILDING
FOR NIAGARA POWER PROJECT
IN LEWISTON, NIAGARA COUNTY, NEW YORK
SPECIFICATION NO. PA-N-23041
NIAGARA CONTRACT NO. N 32

NOTICE TO CONTRACTORS: The Power Authority of the State of New York will receive sealed proposals for Construction of the Administration Building for the Niagara Power Project, in Lewiston, Niagara County, New York, until 10:30 A.M. Eastern Standard Time on the 6th day of April, 1961, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The work under this contract consists of the construction of a building approximately 50 feet by 175 feet. The building will have a basement and first floor with a structural steel frame and glass and structural clay tile walls. Outside work consists of construction of drives, sidewalks, parking areas, building and area drains, sanitary system, curbs, lighting pole foundations with complete underground wiring, underground ducts and vents and area grading.

All work shall be completed on or before May 15, 1962.

Plans, specifications and proposal forms for the work may be obtained from the Power Authority of the State of New York, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Ten Dollars ($10.00) per initial set of contract documents, and Five Dollars ($5.00) per set for additional sets no part of which will be refunded. Plans, specifications and proposal forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bid must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the total of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

Bids: March 30, 1961

State Department of Public Works Albany, N. Y.

NOTICE TO CONTRACTORS

Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m., Eastern Standard Time, on March 30, 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for:

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON NASSAU EXPRESSWAY, VAN WYCK EXPRESSWAY TO SOUTHERN STATE PARKWAY INTERCHANGE, QUEENS COUNTY, WHICH CONSTITUTES CONTRACT SPEC. NO. SM-181.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York.
(b) Mr. Austin M. Sarr, District Engineer, New York State Department of Public Works, 325 West Main Street, Babylon, Long Island, New York.
(c) Mr. William Mende, Principal Building Construction Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. Refunds of deposits for plans, specifications and proposals will be made only in case the deposits of individual sets are $10.00 or more, per Chapter 835, Laws of 1960.

The Engineer's Estimate of cost for this work is $61,400.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $3,200.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law as set forth in "Instruction to Bidders."

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPERINTENDENT OF
PUBLIC WORKS

Bids: March 24, 1961

Delaware Memorial Bridge Repainting Steelwork

DELAWARE INTERSTATE HIGHWAY DIVISION
CONTRACT NO. 44
NOTICE TO BIDDERS

Sealed proposals for repainting steelwork on the portion of the Delaware Memorial Bridge from the west abutment to the west tower, exclusive of the tower, cables and suspenders, at New Castle, Delaware, will be received by the Delaware Interstate Highway Division at the Administration Building, Delaware Memorial Bridge, near Wilmington, Delaware, until 11:00 A.M., Eastern Standard Time, on March 24, 1961 at which time and place said proposals will be opened and read.

Repainting shall consist of cleaning metal surfaces, spot-priming where necessary, and applying one (1) finish coat of paint to all exposed metalwork.

The approximate weight of steelwork to be painted is 10,350 tons.

Work on this project shall begin within ten (10) days after the execution of the Contract and shall be completed on or before October 1, 1961.

Monthly payments will be made for ninety (90) per cent of the work completed each month.

Bidders must submit proposals upon forms provided by the Division.

Each proposal must be accompanied by an acceptable surety bond, certified check or cash in the amount of at least ten (10) per cent of the total amount of the proposal.

The Contract will be awarded or proposals rejected within thirty (30) days from the date of opening proposals. The right is reserved to reject any or all bids.

One set of the contract documents may be obtained from the Delaware Interstate Highway Division at the Administration Building, Delaware Memorial Bridge near Wilmington, Delaware, after March 3, 1961, upon payment of $10.00. Contract documents need not be returned and the above payment will not be refunded. Checks shall be made payable to Howard, Needles, Tammen & Bergendoff.

Delaware Interstate Highway Division
By: J. H. Tyler McConnell, Director
Richard A. Haber, Chief Engineer
Delaware Interstate Highway Division
March 3, 1961.

OFFICIAL PROPOSALS

Bids: April 6, 1961

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
FOR GRADING, TOPSOILING AND SEEDING,
WATERWAYS, WORK SECTION III,
STATION 175 PLUS 00 TO STATION 202 PLUS 00
IN NIAGARA, NIAGARA COUNTY, NEW YORK
SPECIFICATION NO. PA-N-23045
NIAGARA CONTRACT NO. N 36

NOTICE TO CONTRACTORS: The Power Authority of the State of New York, will receive sealed proposals for grading, topsoiling and seeding in the Waterways, Work Section III, from approximately Station 175 Plus 00 to Station 202 Plus 00, in Niagara, Niagara County, New York, until 2:30 A.M. Eastern Standard Time on the 6th day of April, 1961, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The principal items of work are:

Estimated:

84 acres	Grading
16,300 cu. yds.	Excavation, unclassified, for interceptor ditch
5,410 cu. yds.	Sodding
86 acres	Topsoiling, 4 inches to 12 inches thick
86 acres	Preparing seed beds, placing limestone, fertilizer, seeding, mulching and maintenance

All work shall be completed on or before October 1, 1961.

Plans, specifications and proposal forms for the work may be obtained from the Power Authority of the State of New York, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and pre-payment of a fee of Ten Dollars ($10.00) per initial set of contract documents, and Five Dollars ($5.00) per set for additional sets, no part of which will be refunded. Plans, specifications, and proposal forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the total of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5550) will be received at Ogden, Utah until 10 a.m., MST, April 20, 1961, for furnishing labor and materials for Earthwork and Structures, Reservoirs, North Davis Laterals, Unit 2A, Davis Aqueduct Lateral System, Weber Basin Project, Utah. Location near Ogden, Utah in Davis County. Principal items are 130,000 cu. yds. excavation; 63,700 cu. yds. compacting embankments; 32,000 cu. yds. compacting earth lining; and other work. Completion time 230 days. For particulars, address Bureau of Reclamation, P. O. Box 387, Ogden, Utah; P. O. Box 360, Salt Lake City, Utah; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5535) will be received at Lewiston, California, until 10 a.m., PST, April 25, 1961, for furnishing labor and materials for Additions to Keswick Powerplant 230-Kilovolt Switchyard, Central Valley Project, California. Location near Redding, California. Principal items are 1,500 cu. yds.—Excavation, rock; 1,330 cu. yds.—Excavation, common; 250 cu. yds.—Concrete; 270,000 lbs.—Furnishing and erecting switchyard steel structures; 9 breakers—Installing 230-kilovolt, 10,000-mva power circuit breakers; and other work. Completion time 490 days. For particulars, address Bureau of Reclamation, P. O. Box 2511, Sacramento 11, California; P. O. Box 247, Lewiston, California; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5548) will be received at Weslaco, Texas, until 10 a.m. CST, April 20, 1961, for furnishing labor and materials for Clearing, Earthwork, Concrete Lining and Structures for Rehabilitation of 13.0 Lateral System, Lower Rio Grande Rehabilitation Project, Texas. Location near Harlingen, Texas. Principal items are Construction of 72,500 cu. yds. of embankment; 27,400 cu. yds. of excavation for pipe trenches; 2,008 cu. yds. of concrete; furnishing and laying 24,750 lin. ft. of 14-inch to 60-inch concrete pipe; and other work. Completion time 730 days. For particulars, address Bureau of Reclamation, P. O. Box 1609, Amarillo, Texas; P. O. Box 357, Weslaco, Texas; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-5553) SET ASIDE FOR SMALL BUSINESS, will be received at Denver, Colorado, until 2 p.m., Mountain Standard Time, April 25, 1961, for furnishing three (3) 12-foot by 15-foot fixed-wheel gates for Twin Buttes Dam, San Angelo Project, Texas. Delivery is desired within 300 days. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

OFFICIAL PROPOSALS

Bids: April 20, 1961

The Port of New York Authority George Washington Bridge

LOWER LEVEL EXPANSION
DIRECTIONAL SIGNS—PHASE II
CONTRACT GWB-190.243

Pursuant to the provisions of the Highway Law and special provisions for projects financed with Federal Aid Funds, sealed proposals for the sale of materials and performance of Work for the construction of directional signs for the Lower Level Expansion of the George Washington Bridge in the States of New York and New Jersey will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on Thursday, April 20, 1961, at which time said proposals will be opened and read in Room No. 1108.

OFFICIAL PROPOSALS

Contract documents may be seen at the Office of the Assistant Chief Engineer for Design of the Authority, Room 1115. Documents will be furnished upon deposit of $50.00 per set for not more than three sets to any one company (each set including one copy of the contract drawings). Additional sets will be furnished upon payment of $50.00 per set, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

District of Columbia—Highway Construction—Dept. of Highways & Traffic, D. C., March 14, 1961. NORTH CAPITOL STREET IMPROVEMENTS, GRADE SEPARATIONS AT RHODE ISLAND AVE. AND T ST. AND INCIDENTAL WORK RANDOLPH PL. TO BRYANT ST. (FEDERAL AID PROJECT F-7(17)—Invitation C-6183-H, consist. approx. of 60,000 cu. yds. Unclassified Excavation; 21,500 sq. yds. Reinforced Portland Cem. Concrete Base 10"; 1,300,000 lbs. Reinforcing Steel; 11,050 Cu. Yds. Class BB Concrete for Footings & Walls; 45,000 Cu. Ft. Class B Stone Masonry; and 265,000 lbs. Structural Steel. (Wage rates have been predetermined by the Labor Dept.) Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D. C., Room 404, 499 Pennsylvania Ave., N.W., upon deposit of a certified check for $30.00 per set, payable to D. C. Treasurer, (Phone NA. 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EST, April 11, 1961, in Room 424, 499 Penn. Ave., N.W.

(Continued on page 258)

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• *POSITIONS VACANT*

Construction Supervision. Construction engineer for inspection and supervisory work on electric power lines and substations. Opportunity for permanent employment and advancement with well-known consulting engineering firm. Send resume to P-6005, Engineering News-Record.

Electrical Engineer familiar with electric power systems. Permanent employment with opportunity for advancement in long-established consulting engineering firm. Write or call Stanley Engineering Company, Muscatine, Iowa.

Soils Engineer. Graduate Civil Engineer with field experience in foundation investigation, testing, and laboratory management. Will supervise field exploration and soils laboratory testing for highway construction. Required to analyze field information and test data to develop design criteria and recommend construction technique. Salary, to be negotiated depending on experience. Location, Intermountain West. P-6187, Engineering News-Record.

Structural Engineer-Midwest consulting firm seeks Ph.D. to design complex steel structures, reinforced and prestressed concrete. Preference will be given to applicants with practical experience. Permanent position with established firm in business since 1929. Moving expenses paid. Send resume, including education, experience, and personal qualifications to P-6245. Engineering News-Record.

• *POSITIONS VACANT*

Structural Engineer—MS or PhD to conduct design and experimental studies of a variety of structures. Challenging and varied problems involving the application of high strength and constructional alloy steels. Experience not required but applicant should have a thorough understanding of structural behavior. Large research laboratory. Western Pennsylvania. Submit resume and salary requirements to P-6309, Engineering News-Record.

Engineer—Water Works—10 years experience in planning installation of pumps, wells, etc. Permanent employment with water works management company. Location—Philadelphia, Pa. Reply P-6357, Engineering News-Record.

Experienced sewer and water superintendent to be affiliated with established construction company in Illinois. Investment in company necessary. P-6378, Engineering News-Record.

Construction Office Managers—A large southern construction campany has openings for two (2) highly qualified office managers fully experienced in handling lump sum and cost plus multi-million dollar construction contracts. These men must be able to assume full responsibility for all fiscal matters of a field office and be willing to relocate periodically as required. Excellent salary and company benefits. Permanent position. Maximum age, 40. Send a complete resume and a recent photograph. P-6362, Engineering News-Record.

Civil Engineer—Registered or able to obtain registration in Ohio. With three years of experience in structures, highway and sewer work. Starting salary up to $8300, plus benefits, depending upon experience. Apply: City Engineer, 500 Municipal Bldg., Dayton 2, Ohio.

(Continued on following page)

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24 Month Contract on Transmission Lines and Substation Construction in Thailand

Interesting opportunity for graduate Electrical Engineer with a minimum of five years experience on steel tower transmission line and substation construction. To supervise and inspect construction of a 230 KV transmission line and the installation of circuit breakers, shunt reactors, synchronous condenser and protective equipment for 69 and 230 KV substations.

Applicants must pass physical examination and security investigation.

Submit complete resume to:

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AND
ASSOCIATES, Inc.
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McKee is seeking design engineers with a minimum of ten years experience in one or more of the following categories:

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Process Engineers (Refinery)

Instrumentation	Piping
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BOX NUMBER

When answering the classified advertisements in this magazine don't forget to put the box number on your envelope. It's our only means of identifying the advertisement you are answering.

• *POSITIONS VACANT*

(Continued from preceding page)

Permanent Position: Structural engineer with at least an M.S. degree from well recognized engineering school. Well grounded in the Theory of Elasticity to handle complex indeterminate structures. Excellent living conditions, good future for young and responsible engineer. Submit Graduate School credits. Location, North Carolina. P-6338, Engineering News-Record.

Midwest village of 20,000 requires Civil Engineer. Must be registered in Illinois. Salary open. Address: Commissioner of Streets and Improvements, 5156 Main Street, Downers Grove, Illinois.

Senior Engineer in Public Works Department. Experience required in all branches of Municipal Engineering for City of 40,000. Salary $6,500-$8,100 based on experience. Send detailed resume to: City Manager, Poughkeepsie, N. Y.

Village Engineer — Growing metropolitan community of Maplewood (pop. now 19,000). All phases of municipal engineering. Experience and registration required. Salary open. Apply to Village Clerk, 1900 Clarence Street, Maplewood, Minnesota.

Help Wanted—Reinforcing Steel Detailer with a minimum of four years experience. Contact Mr. Dewey Owens, Brocker Mfg. & Supply Co., York, Pennsylvania.

Draftsman—experienced structural steel detailer and checker. Permanent position with established consulting firm. Fringe benefits. Submit resume of experience, references, and salary expected. Samborn, Steketee, Otis and Evans, Libbey-Owens-Ford Building, Toledo 2, Ohio.

Civil Engineer (Soils Mechanics)—Needed for Panama Canal Company, Canal Zone. Salary range from $11,193.75 to $12,818.75. Free transportation to Canal Zone for appointee, dependents and 7000 net pounds household goods. Fringe benefits include: approximately 8 weeks leave with pay annually; vacation in U. S. every two years with free round-trip travel for employee and dependents; and retirement or social security benefits. Applicants must have degree in Civil Engineering and 5 years experience in soils studies and foundation designs, including field control and laboratory testing. Interested applicants should submit Application for Federal Employment, Standard Form 57, which can be obtained from any first or second class U. S. Post Office. Applications should be sent to Personnel Director, Panama Canal Company, Box 2012, Balboa Heights, C.Z.

Hydraulic Engineer, graduate, with 5 to 10 years experience on layout and design of irrigation systems and structures. Permanent position in New York office of engineering firm doing extensive irrigation work in foreign countries. Salary, $10,000-$12,000 per year. Send resume to P-6380, Engineering News-Record.

Structural Engineers—Several immediate openings with New York City Consultant for graduate engineers preferably with experience in bridge design. Submit resume and salary expected. P-6379, Engineering News-Record.

Wanted. Experienced engineer for permanent position with Flood Control Project in Florida. Must have knowledge of construction, contracts, specifications and estimating. Background experience in hydraulics desirable. Paid vacation, sick leave and other benefits. Desirable location to live and pleasant working conditions. Send brief resume including education and experience to Central and Southern Florida Flood Control District, P. O. Box 1671, West Palm Beach, Florida. Salary—$6,200 to $6,526.

Estimator—Salesman to head Steel Fabrication Division. Shop Foreman to set up and manage Steel Fabrication Shop. New concern now entering this field. Major line is related industry. Send complete resume of experience to: Steel Fabrication Division, Box 845, Charleston, South Carolina.

(Continued on opposite page)

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FOR

SOUTH AMERICAN PROJECTS

Extensive programs require high calibre experienced personnel to act in consulting capacity to highway departments. Openings exist for those with proven competence in the following fields:

Location
Construction (Resident)
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Send complete detailed experience record and personal data to—

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CONSTRUCTION

PROJECT SUPERINTENDENTS

Project Superintendent to take complete charge of construction of 300 MW Thermal Power Plant including coal handling & circulating water systems and all Field Personnel facilities. Location Far East. Assignment 3 years duration.

Project Superintendent to take complete charge of construction of 15 MW Thermal Power Station, including 2 Turbine-Generators each 7.5 MW with coal handling & circulating water systems. Location Far East. Assignment 2 years duration.

ASSISTANT PROJECT SUPERINTENDENTS

Assistant Project Superintendent, Civil, for construction of 300 MW Thermal Power Plant including coal handling & circulating water systems; and all Field Personnel Facilities. Location Far East. Assignment 2 years duration.

Assistant Project Superintendent, Civil, for construction of 130 MW Power Station including 2 Turbine-Generators, each 65 MW and complete circulating water system. Assignment 2 years. Location Far East.

Assistant Project Superintendent, Civil, for construction of 300 MW Thermal Power Station consisting of 4 Turbine-Generators, each with 75 MW with coal handling & circulating water systems. Location Far East. Assignment 20 months.

Men must be thoroly exp. by having previously performed function for which application is made. Salary commensurate with experience. Liberal company benefits. Write giving detailed work resume; essential personal data & minimum salary required. All applications acknowledged. All replies confidential. Send complete resume to the

KULJIAN CORP.

Personnel Employment
Construction Division
1200 N. Broad St., Phila. 21, Pa.

• POSITIONS VACANT

(Continued from opposite page)

R.C.E. or L.S. with California Registration for management and part ownership of desert office. $700 mo. + %. P-6386, Engineering News-Record.

Graduate Civil Engineer. Registered or qualified for registration in West Virginia. Minimum 5 years highway design experience and some experience in other public works. To assume office and field supervision duties in consultant's office in West Virginia. Send complete resume and salary requirements to P-6375, Engineering News-Record.

Bridge and Highway Designers. We have a number of openings for experienced Bridge and Highway Designers. No arbitrary length of previous employment is established; selection will depend on the design know-how and judgment a man has absorbed from his own particular experience. Only engineers with a sense of responsibility and a professional approach to their duties will be accepted. Long range backlog of work available, both domestic and foreign. Salaries depend on the individual and are individually negotiated. Increases are based primarily on merit. Other benefits are liberal. Write or telephone for application blank to Capitol Engineering Corporation, Dillsburg, Pennsylvania.

Chief Engineer—Kansas City medium-sized manufacturer of light gauge stainless and aluminum sheet metal products—Desire M.E. to manage department of 4 Design Engineers and Quality Control. Give us resume and earning level in confidence. All replies acknowledged. P-6387, Engineering News-Record.

Engineer—Construction firm engaged in road and site development requires experienced engineer. Must be qualified in computing quantities and determining prices for completion of a formal bid. Man must be familiar with field problems and ready to assist in their solutions. One man position requires individual ready to assume responsibility. Good paying position for the right man. Submit complete resume of previous experience with your application. P-6344, Engineering News-Record.

Senior Civil Engineer (Physical Research). Salary $7818 to $9408. (Salary increase expected April 1.) Open to New York State residents. Requires N.Y.S.P.E. license and two years of civil engineering experience including one year of research experience. For details write Recruitment Unit, Box 86C, New York State Department of Civil Service, The State Campus, Albany 1, New York.

• POSITIONS WANTED

Const. Supt.-All phases of grading and bridge construction, state and federal projects. Complete job management. PW-6254, Engineering News-Record.

Construction Superintendent—over 30 years experience all types road construction and paving. PW-6192, Engineering News-Record.

Construction Manager, Registered Civil Engineer, mature, broad experience in estimating, bidding, contract negotiation, organization, administration, operation, and closeout of large construction projects, domestic and foreign. Expect to complete present assignment June 1961. Desire connection with large volume construction organization, preferably one doing business in southern or southwestern United States, but will consider foreign assignment. Detailed experience record and references furnished upon request. PW-6234, Engineering News-Record.

Construction Manager-Estimator-C. E.-age 40. Experienced as manager of commercial, industrial and heavy construction from bid to completion. Available. Will relocate, travel, invest. PW-6227, Engineering News-Record.

Master Mechanic, Eqpt. Supt. or Service Manager twenty-five years as supervisor of repairs, maintenance and operation of heavy equipment. Best of references, available immediately. PW-6243, Engineering News-Record.

Asst. Proj. Mgr., BCE, PE 10 yrs. exp. highways & housing, G. C. and Engrs. NYC area. Desires work where ability and drive will be utilized. PW-6222, Engineering News-Record.

General Project Manager & Contract Administr. 22 yrs. heavy constr. major projects U. S. & O. S. negotiations to completion. PW-6292, Engineering News-Record.

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Senior Engineer and Inspector-Exceptional background in inspection, expediting and material control work on multi-million dollar projects-foreign and domestic. Inspections in over 500 major U. S. manufacturing plants utilizing up-to-date techniques including x-ray, magnetic particle and electronic devices. Available on contract or salary basis. Take complete charge material coordination, inspection and/or expediting or available for supervisory position on foreign construction projects. L. E. Parker, 666 No. Terrace Ave., Mount Vernon, New York.

Superintendent-20 years experience on sanitary and storm sewers. Capable of complete charge. Prefer Northeast. PW-6239, Engineering News-Record.

Project Engineer with diversified experience, about 12 years, of Design, Construction-Supervision, Contract Administration, Reports and specifications for bldgs, highways, dams, etc. Specializes in foundation problems and materials laboratory supervision. P. E. Licenses & M.S. degree, 42. Desires responsible position preferably with consulting engineers. Any location. Available this spring at end of overseas assignment. PW-6328, Engineering News-Record.

B.S.C.E. Age 37, 10 yrs experience supervision Power industry also exp highway & bridge engr. Prefer South or Midwest. Desire permanent loc. PW-6312, Engineering News-Record.

Engineering Administrator — Construction Manager — Project Engineer — Professor; 23 yrs experience all phases; Reg. P.E.; F. ASCE; seeks responsible affiliation with consulting, construction firm, or college. South or Southwest. PW-6333, Engineering News-Record.

Const. Supt. Sr. Hirise specialist housing, commercial. Reliable. Avail. now. PW-6331, Engineering News-Record.

Structural Engineer, Ph.D., P.E. 15 years design & supervision exp. in steel, concrete, buildings, bridges, industries, foundations. Responsible position. Prefer Great Lakes vicinity. PW-6329, Engineering News-Record.

Gen Supt or Supt—West Pointer—28 years experience, heavy construction, all phases. 9 dams—heavy foundations (including marine work)—missile bases—bridges—coffer dams—pile driving—mass concrete—mass rock & dirt excavation. Some buildings—capable administrator—good organizer. Have top following. PW-6307, Engineering News-Record.

Office Manager—Chief Acct. 20 yrs. hvy. const. field admin. costs, payrolls, purch., contracts. Specializing joint ventures. Relocate Avail. May 1. PW-6311, Engineering News-Record.

Former Consultant, adequate capital, extremely productive, 55, seeks association with established engineering organization, New York City or Miami area. PW-6197, Engineering News-Record.

Construction Supt. General Construction. PW-4482, Engineering News-Record.

Civil Engineer, P.E., R.L.S., BSCE, MSCE. Resume upon request. PW-6376, Engineering News-Record.

Estimator-Engineer, 44, BSCE, P.E. 3 states, 15 yrs. experience in construction of multi-million dollar projects, from initial bidding purchasing, office engineering to job completion, incl. customer relations. Desires employment with opportunity with commercial and industrial contractor. PW-6373, Engineering News-Record.

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Supt. Heavy Const'n 30 years experience all phases highway work. Complete job management. PW-6383, Engineering News-Record.

Str. Engineering M.S. registered. 7 yrs. exp. reinf. concr. & steel. Analysis complex indeterminate str. wants to relocate to West Coast. $8,000. PW-6345, Engineering News-Record.

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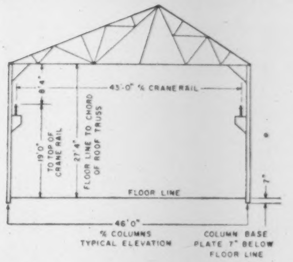

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OFFICIAL PROPOSALS

Continued from page 253

Bids: April 14, 1961

Port of New Orleans

Sealed bids will be received on Requisition Eng 6012 by the Board of Commissioners of the Port of New Orleans at their office, Room 204, No. 2 Canal Street, until Friday, April 14, 1961, at 2:00 o'clock P.M., and then publicly opened for furnishing approximately 460,000 lin. ft. of 12.75" O.D. and 66,000 lin. ft. of 14" O.D. by ¼" wall thickness, steel pipe piles, and 5,740 three-quarter inch thick end plates, rail delivery. Piles advertised herein are in addition to, and separate from, the steel pipe piles advertised on Requisition Eng 6014.

Deposit of 5% of bid or $100,000.00, whichever is smaller, by certified or cashier's check, is required with bid.

Acceptable surety bond for amount of bid is required with notarial contract.

Board may accept or reject any bids, waive informalities and award contract in its best interest.

Specifications and bid forms may be obtained at Room 214 upon deposit of $10.00 per set, by check payable to Board, refundable only to the extent of three sets and only to anyone submitting a bid directly to Board.

District of Columbia—Highway Construction—Dept. of Hwys. & Traffic, D. C., Mar. 2, 1961. PAVING ANACOSTIA FREEWAY, CHESAPEAKE ST. TO D. C. LINE, FEDERAL AID INTERSTATE PROJECT NO. I-295-2(21)0, Invitation No. C-6173-H, consisting of approx. 41,481 tons Plant Mix Aggregate Base Course; 4,461 tons Asphalt Concrete Surface Course Class C; and 11,012 sq. yds. Reinf. Portland Cement Concrete Pavement. (Wage rates have been predetermined by Labor Dept.) Bid forms, plans and specifications are now available from Supervisor, Bid & Contract Division, Procurement Office, D. C., Room 404, 499 Pennsylvania Ave., N.W., upon deposit of a certified check for $60.00 per set, payable to D. C. Treasurer, (Phone NA 8-6000, Ext. 448). SEALED BIDS to be opened 3:00 PM, EST, Mar. 30, 1961, in Rm. 424, 499 Pa. Ave., N.W.

Bids: April 14, 1961

Port of New Orleans

Sealed bids will be received on Requisition Eng 6014 by the Board of Commissioners of the Port of New Orleans at their office, Room 204, No. 2 Canal Street, until Friday April 14, 1961, at 2:00 o'clock P. M., and then publicly opened for furnishing approximately 194,000 lin. ft. of 12.75" O. D. and 21,000 lin. ft. of 14" O. D. by ¼" wall thickness, steel pipe piles, and 2,365 three-quarter inch thick end plates, rail or water delivery. Files advertised herein are in addition to, and separate from, the steel pipe piles on Requisition Eng 6012.

Deposit of 5% of bid, by certified or cashier's check, is required with bid.

Acceptable surety bond for amount of bid is required with notarial contract.

Board may accept or reject any bids, waive informalities and award contract in its best interest.

Specifications and bid forms may be obtained at Room 214 upon deposit of $10.00 per set, by check payable to Board, refundable only to the extent of three sets and only to anyone submitting a bid directly to Board.

Bids: April 11, 1961

The Peninsula Airport Commission

ADVERTISEMENT FOR BIDS

The Peninsula Airport Commission, H. K. Peebles, chairman, Newport News, Virginia, will receive bids until 2 P.M. April 11, 1961, at the Office of the Airport Manager, The Patrick Henry Airport, Newport News, Virginia, for cleaning, laying out and painting the markings, lettering and striping on Runway 2-20 and Runway 6-24. Plans and specifications are available at the office of R. F. Pyle, Engineer, 99 28th Street, Newport News, Virginia, on deposit of Twenty-five Dollars ($25.00) which will be refunded upon return of the plans and specifications within five (5) days after the opening of the bids. Prospective bidders are reminded that this is a Federal Aid job with the usual requirements as to payroll records, hours of work and rates of pay. The Commission Engineer will be at the Airport Manager's office Monday April 3, 1961, at 2 P.M. to show the prospective bidders the proposed work.

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Editorials

Built-in Troubles: Highways

REQUIRING ROADS TO BE CONSTRUCTED under rules and regulations that unnecessarily limit contractors in the methods and equipment they can use is a poor way to advance the highway program. It causes troubles that could be avoided if a freer play were allowed contractor ingenuity and equipment manufacturer inventiveness.

These built-in troubles largely stem from the difficulties that are met in trying to obtain acceptance by the state highway departments of improved equipment and methods. Some highway engineers are reluctant to approve, or even try, new ideas. And some state highway departments conduct contract work under over-restrictive "methods" specifications that make new approaches difficult, if not impossible. In addition, differing state requirements cause other troubles.

There is little reason for outmoded and restrictive specifications. For example, why should some specifications for bituminous concrete require mixing times 50% to 100% longer than those necessary to produce a uniform and thoroughly coated mix? Or why should one roller manufacturer find it necessary to produce 20 different models in order to meet varying specifications requirements? Or why are more states not willing to give the slip-form paver—for which substantial cost-savings are claimed—a real try?

An extreme example may be seen in some specifications that not only control the method and equipment, but inadvertently limit the production rate. One contractor recently cited a project on which he had decided he could use three rollers effectively. But because of specification limitations he accomplished the permissible work with two machines, while the third sat idly by. This is "featherbedding" in the equipment field.

Of course, the story is not entirely one-sided. Highway departments are public agencies, and there is some justification for reliance on tried and true methods. But this is no excuse for resisting new ideas.

Three specific steps can and should be taken to remove roadblocks to equipment and methods acceptance:

- State highway department specifications must be made flexible enough to permit contractors to exercise their experience and ingenuity, particularly in the selection of equipment.
- Wider use should be made of end-result specifications, in which the quality of the end product is controlled, while allowing the contractor reasonable if not complete freedom as to how that result is obtained.
- Serious consideration should be given to the establishment of more nearly uniform specifications among the various highway departments. Uniform design standards are applied to the Interstate system. Why not uniform construction standards?

Execution of these three steps will reduce highway costs by permitting contractors to carry out work more effectively and by providing a needed incentive for construction equipment manufacturers.

Key participants in an equipment symposium held during the recent ARBA convention (ENR Mar. 16, p. 21) proposed a vital first step—the creation of a joint ARBA-AASHO Committee on Equipment. It is hoped that this committee will be established soon, since it will provide a forum in which the issue of equipment and methods acceptance can be usefully discussed and, hopefully, resolved.

Built-in Troubles: Missiles

DESIGNING MISSILES at the same time that the bases are being constructed to launch them—the so-called concurrency concept—is asking for the troubles that have continued to plague the missile program. It is only by keeping constantly in mind the fact that the troubles are built-in that probers and prodders of the program can be of any help in raising its performance.

The latest probe by a Congressional subcommittee (ENR Mar. 9, p. 28) is a case in point. Thus the committee's report recommends approval of more definite construction designs prior to contract awards, and also that more "reasonable" target dates be used.

These are good recommendations, and were they to be put into effect it seems likely that both delays and extra costs would be decreased. The difficulty is that they clash with the concept of concurrency of missile design and base construction. Unless this concept is relaxed they have little practicality. And so far, such relaxation has not been considered by our top military strategists to be a safe and sensible course to follow.

Under present circumstances the missile program is as much a research program as it is a construction program. As such it is not nearly as possible to set definite time and cost schedules as would otherwise be the case. Criticizing its shortcomings on these scores is, therefore, unrealistic and serves no useful purpose.

A more profitable course, at least until the high command decides that missile designs can be frozen as soon as a construction contract is let, is to reduce some of the bidding risks that construction contractors have been required to assume. A start in this direction was made on the recent contract for the first Minuteman base (ENR Mar. 9, p. 28). Not only were stiff cumulative penalty clauses eliminated, but an attempt was made to include incentives for beating a target date and for cost savings.

More such improvements in the types of contracts being offered missile base bidders are needed. This is the practical way to speed up the missile program. Troubles built in by the concurrency concept cannot be abolished by ignoring that the concept is official policy.

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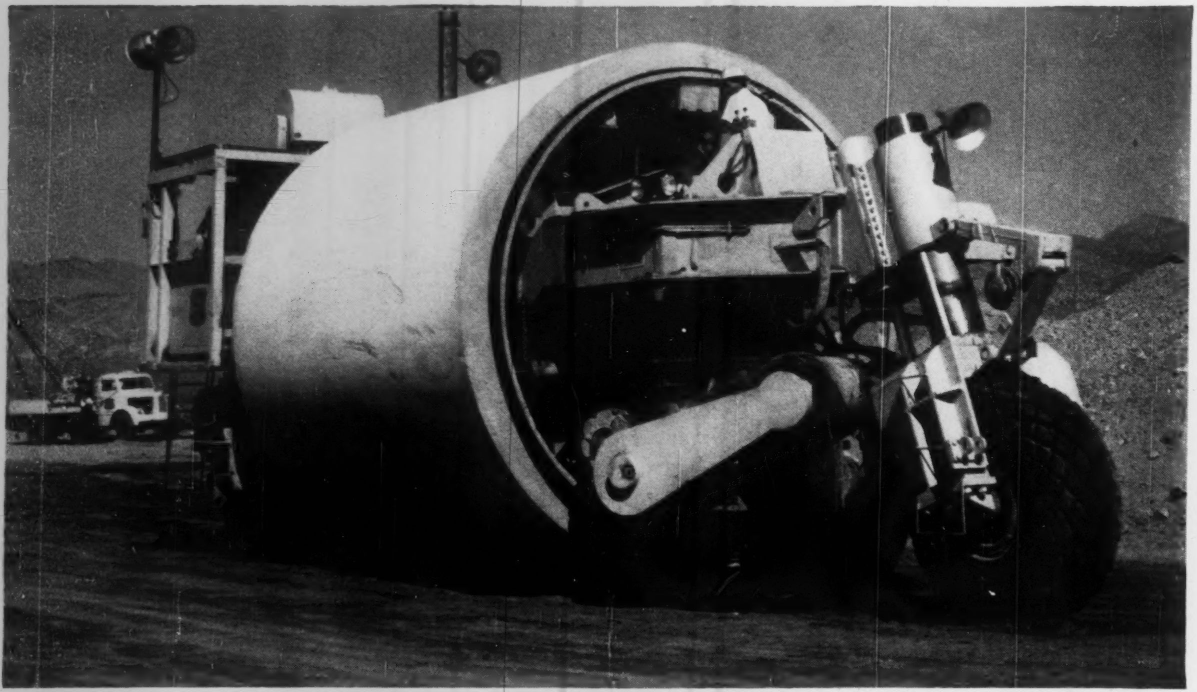

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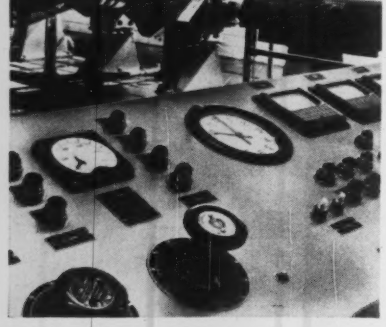

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